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GEOPHYSICAL ABSTRACTS[1]

No. 33

Compiled by Frederick W. Lee[2]

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1. GRAVITATIONAL METHODS

(556) BELLE ISLE TORSION-BALANCE SURVEY, ST. MARY PARISH, LOUISIANA

By Donald C. Barton

Bulletin of the American Association of Petroleum Geologists, Tulsa, Okla., vol. 15, No. 11, 1931, pp. 1335-1350.

The geological prediction was made that the Belle Isle salt dome might be much larger than supposed. The torsion balance was used to corroborate that prediction. From the data of the torsion-balance survey, calculations were made of the probable depth, thickness, and edge of the cap rock. Seven sulphur-test holes were drilled on locations selected on the basis of the calculated conformation of the cap. The predictions in regard to depth were shown to be 73 per cent correct, and in regard to the thickness of the cap, 58 per cent correct. The causes of the errors were probably the unfavorable marshy terrane, the assumption of a slightly too small relative density for the cap rock, and the irregularity of the conformation of the dome.--Author's abstract.

(557) AN APPLICATION OF THE FREE-AIR REDUCTION OF GRAVITY

By Harold Jeffreys

Gerlands Beitrage zur Geophysik, Leipzig, vol. 31, No. 4, 1931, pp. 378-386.

It is shown that the application of the theorem of Green's equivalent stratum to the earth's gravitational field leads easily to an expression of the field in terms of that due to a certain distribution of mass over the geoid, which possesses complete first-order accuracy. The free air reduction of gravity is fundamental in this treatment. From this result a new derivation of Stokes' expression of the elevation of the geoid is obtained.--Author's abstract.

(558) SULLA DEPRESSIONE GRAVIMETRICA DI GATTATICO-PARMA

(ON THE GRAVIMETRIC DEPRECIATION NEAR GATTATICO-PARMA)

By A. Belluigi

Rendiconti della R. Accademia Nazionale dei Lincei, Rome, vol. 14, No. 1-2, 1931, pp. 24-27.

The distribution of stations of observations near Gattatico and the results of these observations are described. One map showing the isogams of the region and one diagram giving the curves of gravity are added.--W. Ayvazoglou.

(559) SULLA DEPRESSIONE GRAVIMETRICA DI CARPANETO

(ON THE GRAVIMETRIC DEPRECIATION IN CARPANETO)

By A. Belluigi

Rendiconti della R. Accademia Nazionale dei Lincei, Rome, vol. 13,
No. 10, 1931, pp. 745-748.

The author describes important gravimetric phenomena of an area of about 300 square kilometers near Carpaneto.--W. Ayvazoglou.

(560) ANALYSIS OF SOME TORSION-BALANCE RESULTS IN CALIFORNIA

By Robert H. Miller

Bulletin of the American Association of Petroleum Geologists, Tulsa,
Okla., vol. 15, No. 12, 1931, pp. 1419-1429.

The writer discusses torsion-balance results obtained in the Los Angeles Basin. It is shown that here the distribution of gravity which is observed in the vicinity of an oil field is in no way connected with the inherent density of the beds. One phase of the mathematical theory of geophysics dealing with the gravity distribution set up by the folding of an otherwise uniformly dense bed is discussed, and it is shown that, in the region of question, the distribution of gravity is entirely the result of this folding. An approximate method of interpreting gravitational distribution in terms of subsurface structure is described.--Author's abstract.

Two written discussions, one by Frank A. Moss and the other by Donald C. Barton, are added to the article.

2. MAGNETIC METHODS

(560) ON OBSERVATIONS OF MAGNETIC ANOMALIES WITH A VARIOMETER

By J. G. Koenigsberger

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 36, No. 3, 1931, pp. 243-251.

The accuracy of determinations for magnetic anomalies in horizontal intensity, H, and vertical intensity, Z, using the author's variometer, is now as good as that obtained by absolute measurements. The variometer can be used accurately without resetting for determination on lines as long as 300 kilometers in the north-south direction. The question as to whether local anomalies may be affected by secular variations is discussed theoretically. An attempt to check the theory developed, using previous observations of intensity, gives no definite conclusions, as absolute measurements of inclination with the dip-needle are not of sufficient accuracy to give a reliable test. In the study of a deep-seated regional anomaly and in the preparation of land magnetic charts, it is found best to discard all values at stations where the adjacent rocks have differences of susceptibility of more than 2.10^{-4}.--Author's abstract.

(561) GEOPHYSICAL STEREOGRAMS

By J. Bartels

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 36, No. 3, 1931, pp. 187-198.

The use of stereograms for the representation of geophysical data is discussed. Formulas and practical rules for constructing stereograms and anaglyphs (stereoscopic drawings in two colors) are given. Ten sample stereograms, based on unpublished material, are reproduced and discussed. With the exception of No. 1, which illustrates the principle of construction, and No. 10, which shows upper-air currents at Apia, Samoa, the stereograms bear on magnetic phenomena: namely, Nos. 2 to 5, diurnal and magnetic variations at Watheroo (Australia); No. 6, changes during part of a magnetic storm; No. 7, differences of the mean magnetic vector on disturbed and quiet days at Potsdam, 1915 to 1928; No. 8, world-chart of secular variation for 1925; No. 9, globe showing magnetic axes of the earth, and distribution of magnetic observatories. While some of the stenograms present only new illustrations of well-known facts, the discussions which accompany Nos. 4 to 8 suggest some novel points.—Author's abstract.

(562) SOME RESULTS OF MAGNETOMETER SURVEYS IN CALIFORNIA

By Edward D. Lynton

Bulletin of the American Association of Petroleum Geologists,
Tulsa, Okla., vol. 15, No. 11, 1931, pp. 1351-1370.

The writer describes magnetic conditions associated with some typical structural features in California -- an anticline, a syncline, an outstanding magnetic feature in the San Joaquin Valley, a buried fault near Mount Diablo, a part of Ventura County, and Kettleman Hills.--Author's abstract.

(563) MAGNETIC DISTURBANCE CAUSED BY BURIED CASING

By William M. Barret

Bulletin of the American Association of Petroleum Geologists,
Tulsa, Okla., vol. 15, No. 11, 1931, pp. 1371-1389.

A vertical string of casing becomes magnetized by induction under the influence of the terrestrial magnetic field. For theoretical investigation we may treat such a casing as a bar magnet having an exaggerated ratio of length to diameter. Formulas are derived, based on the fundamental law of Coulomb, to express the anomalous components of the magnetic elements in different horizontal planes and at different radial distances from the basing head. Curves representing these equations are shown. Graphical illustrations of the composition of these anomalous components and the normal components of the earth's magnetizing field are included, together with typical experimental data obtained in the field.—Author's abstract.

(564) BRUNTON COMPASS ATTACHMENT FOR MEASUREMENT OF HORIZONTAL MAGNETIC INTENSITY

By John H. Wilson

Bulletin of the American Association of Petroleum Geologists,
Tulsa, Okla., vol. 15, No. 11, 1931, pp. 1391-1397.

Utilizing the Brunton compass commonly employed by geologists, an attachment has been devised making it possible to measure the horizontal intensity of the earth's field. The operation of the instrument, the theory and derivation of equations, and the results of several surveys with the instrument are presented.--Author's abstract.

(565) MAGNETISCHE MESSUNGEN ÜBER BASALTSTEINLAGERN IN OBERHESSEN

(MAGNETIC MEASUREMENTS OVER THE BASALT ROCK DEPOSITS IN OBERHESSEN)

By Gerh. Meyer

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 1, No. 4, 1931, pp. 420-431.

The tests made in the region of basalt rock deposits showed that the method of magnetic investigation for locating ore deposits and seams is not without fair chances for success, as the ore deposits lie in troughs between the basalt strata, resulting in characteristic magnetic profiles.

These ore pockets can be recognized in the magnetic profile by the depressions produced by them. Ore deposits are therefore chiefly to be sought where values occur which are low in comparison with the immediate vicinity. It is immaterial whether the surrounding region gives negative or positive values.

Since the basalt is more susceptible than the ore, the details of the magnetic profile correspond exactly with the details of the geological profile of the basalt.

Whether the rules found for ore deposits in basalt strata are also valid for deposits in titaniferous trap strata must be determined by further investigations.

If the extension in the plane of the ore deposit is sufficiently great the richer parts will be indicated by higher Z-values.

Petrographic investigations of the rocks occurring in the region tested have been planned. These will aid in clearing up the difficulties of interpreting the irregularities, especially the partly positive partly negative reading obtained over the basalt strata.

Obviously, here, as well as in all geophysical investigations, every known geological fact must be taken into consideration when interpreting the results. Author's abstract.

(566) MAGNETISCHE UNTERSUCHUNG EINES BASALTSTEINBRUCHGELÄNDES

(MAGNETIC INVESTIGATION OF A BASALT QUARRY TERRITORY)

By H. Reich and Ruppr. Schröder

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte
Geophysik, Leipzig, vol. 1, No. 4, 1931, pp. 432-436.

The territory of a basalt quarry was investigated with an A. Schmidt vertical field balance. Δ Z-values from 1000 to -600 γ were obtained. A comparison with the available geological information from the open lodes showed excellent agreement between the two sets of data. The deposit is magnetized in accordance with the earth's magnetic field. Finally, the economical value of such an investigation is stressed.--Author's abstract.

(567) MAGNETISCHE Z-VARIOMETERMESSUNG AM SERPENTIN VON FRANKENSTEIN IN SCHLESIEN

(MAGNETIC Z-VARIOMETER MEASUREMENT OF A SERPENTINE DEPOSIT AT FRANKENSTEIN IN SILESIA)

By K. Stöcke

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte
Geophysik, Leipzig, vol. 1, No. 4, 1931, pp. 457-468.

A serpentine deposit is investigated by means of a magnetic Z-balance. Important conclusions regarding the extent of the deposit and its stratification can be drawn from the results. The measured Z-effects vary between -300 (-900) and +1400 gammas.--Author's abstract.

(568) REMANENTER UND INDUZIERTER MAGNETISMUS BEI EINLAGERUNGEN

(REMANENT AND INDUCED MAGNETISM OF DEPOSITS)

By J. Koenigsberger

Gerlands Beiträge zur Geophysik; Ergänzungshefte für angewandte
Geophysik, Leipzig, vol. 1, No. 4, 1931, pp. 469-471.

Considerations of the remanent and induced magnetism of rocks are discussed.

From the determinations of the total remanent magnetism made by Koenigsberger (Geophys. Abs. 18, p. 4) and from the investigations carried out by Puzicha (Geophys. Abs. 22, p. 34), the author draws the conclusion that the natural remanent magnetism and the induced magnetism of eruptive rocks may often be compared, whereas in rocks formed naturally, the directions of these two magnetizations are often different. This is to be taken into consideration in interpreting the magnetic anomalies.--W. Ayvazoglou.

3. SEISMIC METHODS

(569) COMING TO GRIPS WITH THE EARTHQUAKE PROBLEM

By N. H. Heck

Journal of the Franklin Institute, Philadelphia, vol. 212, No. 3, 1931, pp. 269-303.

From the viewpoint of the geophysicist the earthquake investigation indicates all that there is to know about the nature of the earthquake itself as a physical phenomenon, the transmission of waves, and, incidentally, the nature of the transmitting medium, and gives information about the interior of the earth which is obtainable in no other way.

After a description of several types of seismographs Heck explains the principal facts concerning seismic waves and interpretation of seismograms.

Some destructive effects of earthquakes are shown in pictures, and a map of known earthquakes of the United States is added.

The development of seismology so as to meet all needs is urged.--W. Ayvazoglou.

(570) STRONG-MOTION INSTRUMENTS EXPLAINED

Editorial note

Earthquake Notes. Eastern Section Seismological Society of America, Washington, D. C., vol. 3, No. 3, 1931, pp. 11-12.

The note reads as follows:

> The meeting of the Philosophical Society of Washington for November 21 was given over to papers and discussion concerning instruments for recording strong earthquake motions. N. H. Heck introduced the subject of the evening with a paper "The history and background of the study of strong earthquake motions." Frank Wenner explained the construction and theory of accelerometers which he has recently devised. A paper by M. W. Braunlich of the Massachusetts Institute of Technology, describing a contact accelerometer for use in starting recording apparatus, was read by H. E. McComb. D. L. Parkhurst explained the construction of an electric motor-driven recorder developed in the Instrument Division of the Coast and Geodetic Survey. H. E. McComb described a clock-driven recorder and releasing device which he has developed. The Braunlich contact accelerometer was demonstrated in conjunction with this apparatus. Results of a test of the contact accelerometer are shown in a figure.

The last three papers were illustrated with slides. Some of the slides with McCombs paper showed results obtained with the recorder, thus indicating its efficiency.--W. Ayvazoglou.

(571) SEISMOLOGY AT THE UNIVERSITY OF CALIFORNIA

By Perry Byerly

Earthquake Notes. Eastern Section Seismological Society of America,
Washington, D. C., vol. 3, No. 3, 1931, pp. 9-10.

The author describes the equipment of a group of three subsidiary seismographic stations established about San Francisco bay, the records of which are sent to the University of California station. These stations are located on Mt. Hamilton, at Stanford University, and in San Francisco.

The office and laboratory of the seismographic stations are located in Bacon Hall of the University of California campus. A small shaking table is part of the equipment and is used in testing the response of seismographs. --W. Ayvazoglou.

(572) USE OF EXISTENT WELLS AS AN ADJUNCT TO SEISMOGRAPH

By Burton McCollum and Wilton W. LaRue

The Oil Weekly, Houston, Tex., vol. 62, No. 1, 1931, pp. 29-34.

The authors discuss in this article the possibility of using existent wildcat wells for the purpose of making seismic explorations of the surrounding territory for very deep-seated domes. The principle of the method consists of running a detector of seismic waves to the bottom of a well, which for various reasons may have missed the dome. With the detector inside of the well a series of shots are fired on the surface on a circle having the center approximately at the well and the circumference distant from 5 to 7 miles from the well. Deep-seated domes might be revealed by such a deep exploration.

The successful use of the described method of placing detectors down in wells has opened the way for the development of an accurate method of profiling down the sides of salt domes to depths of 5,000 to 6,000 feet. The method of deep profiling of salt domes is explained. A further application of this method consists in the determination of the position of a fault plane at various depths (shown in a figure).

The authors conclude that with two or, at the most, three wells, properly selected around any given dome, the entire periphery of the dome can be thoroughly explored.—W. Ayvazoglou.

(573) UTILIZATION OF EXISTING WELLS IN SEISMOGRAPH WORK

By Burton McCollum and Wilton W. LaRue

Bulletin of the American Association of Petroleum Geologists,
Tulsa, Okla., vol. 15, No. 12, 1931, pp. 1409-1417.

The writers describe a method of utilizing a well in a seismic exploration of the surrounding area for deep domes, with particular reference to a supposed dome near the well which, for any reason, may have missed its objective. Most of the paper is devoted to methods of utilizing a well near the flank of a salt dome for the purpose of making a seismic profile deep down the flanks. These methods are especially adapted to determining the extent of "mushrooming" such as that existing at Barbers Hill and the Allen dome.-- Authors' abstract.

(574) APPLICATION OF SEISMOGRAPHY TO GEOLOGICAL PROBLEMS

By Eugene McDermott

Bulletin of the American Association of Petroleum Geologists,
Tulsa, Okla., vol. 15, No. 11, 1931, pp. 1311-1334.

This paper contains an outline of the principles and methods of applied seismology. The science of seismography is predicated on the elastic properties of earth materials. The refraction and reflection of elastic waves and the conditions governing these are considered. These two phenomena are closely related. The application of the seismic method to salt-dome exploration on the Gulf Coast and the development of the refraction method for general structure determination is followed by an explanation of the reflection method. Several actual reflection records indicate the method of identifying reflections.--Author's abstract.

Written discussions on McDermott's paper presented by B. B. Weatherby, G. H. Westby, and Paul Weaver are added.

(575) THE VELOCITY OF THE P WAVE IN THE SURFACE LAYER OF THE EARTH CRUST

By H. Honda

The Geophysical Magazine, Tokyo, vol. 4, No. 1, 1931, pp. 29-39.

In this article the author gives some results of his calculations on the velocity of the longitudinal seismic wave (P-wave) in the surface layer of the earth crust based on the data of the observations obtained during the earthquakes which occurred on March 22, 1930, at Itō in Idu province and on November 25, 1930, in the northern part of Idu.

The calculations were carried out for both earthquakes independently of each other, and the results are shown in tables and figures.--W. Ayvazoglou.

(576) ON THE RAYLEIGH WAVE PROPAGATING OVER THE SURFACE OF A HETEROGENEOUS MATERIAL

By H. Honda

The Geophysical Magazine, Tokyo, vol. 4, No. 2, 1931, pp. 137-145.

A mathematical investigation of the problem of the Rayleigh wave propagating over the surface of a heterogeneous semi-infinite material is given.

Honda's summary reads as follows:

> The problem of the surface wave of Rayleigh's type propagating along the surface of a heterogeneous material, of which Lame's constants λ and μ increase linearly with the increasing depth, and the density remains constant throughout the material, was solved approximately under some assumptions. And the expressions showing the velocity, the dispersion of the wave propagation, and the displacement components of the particles of the material and so on were obtained.--W. Ayvazoglou.

(577) ON THE VELOCITY OF A SEISMIC WAVE IN THE UPPER LAYERS OF THE EARTH CRUST

By K. Sagisaka

The Geophysical Magazine, Tokyo, vol. 4, No. 2, 1931, pp. 147-155.

In this article Sagisaka gives a short account of his investigations based on a detailed examination of the time curve obtained for the strong earthquake at Itō on March 22, 1930; from the results of his work he draws the conclusions that at least in central and southeastern Japan there exists no such distinctly discontinuous stratification as that found in Europe by A. Mohorovičić.

Curves showing the relation between the velocity of the seismic longitudinal wave and the depth are given in a figure.--W. Ayvazoglou.

4. ELECTRICAL METHODS

(578) GEOPHYSICAL INVESTIGATION AT BRIDGE RIVER TUNNEL

By E. E. Carpenter and E. G. Leonardon

The Miner, Vancouver, B. C., vol. 4, No. 7, 1931, pp. 11-12.

A brief explanation of the theory of rock resistivity upon which geophysical exploration is based is given. The differences in the conductivities of the rocks are illustrated by the following figures: Clays and unconsolidated clayey formations, 10 to 30 ohms; clayey-calcareous soft terrains, between 20 and 400 ohms; eruptive or metamorphic masses may have resistivities, according to their lack of porosity, ranging from 200 to 2,000 ohms and up. The resistivities of sands vary greatly according to their dryness and the impurities contained therein.

A study was undertaken to obtain a general perspective of the rock conditions on the south side of the tunnel. The results obtained by electrical prospecting are shown in an example provided at the 13,200-foot Bridge River tunnel recently completed by the British Columbia Electrical Railway Co.

Three resistivity profiles were traced. The results are summarized in a figure. The accuracy of the results obtained by examination of the resistivities of the rocks and their mechanical properties is proved by comparison with the constitution of rocks actually encountered along the tunnel.

The importance of electrical coring, by which the study of large volumes of ground is possible, is mentioned.--W. Ayvazoglou.

(579) NUOVE VIE PER LO STUDIO DI PICCOLE DEFORMAZIONI DELLE LINEE DI CORRENTE SULLA SUPERFICIE D 'UN SUOLO ELETTRIZZATO

(NEW WAYS FOR STUDYING SMALL DEFORMATIONS OF THE CURRENT LINES ON THE SURFACE OF AN ELECTRIFIED GROUND)

By Arnaldo Belluigi

Congrès International des Mines, de la Metallurgie et de la géologie appliquée, Liège, Session 6, 1930, pp. 285-287.

The question of deformations and alterations in an electrical or magnetic field of force produced by the effect of deep perturbations caused by spherical or cylindrical masses is examined. Formulas are derived.--W. Ayvazoglou.

(580) DAS NORDSCHWEDISCHE GOLDFELD BOLIDEN BEI SKELLEFTEÅ

(THE BOLIDEN GOLDFIELD NEAR SKELLEFTEA IN NORTHERN SWEDEN)

By Rudolf Schreiter

Zeitschrift der Deutschen Geologischen Gesellschaft, Berlin, vol. 83, No. 4, 1931, pp. 233-243.

Chapter 3 of this article deals with the "Application of geophysical methods in the Skellefte district."

After a brief geological sketch of this district the author gives a description of geophysical investigations carried out in the Kristineberg iron field and Rakkejaur iron field (both according to Sundberg, Lundberg, and Eklund) and finally of the successful results obtained by electrical methods of prospecting in discovering the Boliden gold field.--W. Ayvazoglou.

(581) PRACTICAL INVESTIGATIONS OF THE EARTH RESISTIVITY METHOD OF GEOPHYSICAL SURVEYING

By G. F. Tagg

Proceedings of the Physical Society, Cambridge University Press, vol. 43, part 3, No. 238, 1931, pp. 305-320.

The paper deals with the methods of geophysical survey which depend on the measurement of the electrical resistivity of the earth. The theory is explained for the case of a single horizontal stratum, and practical tests are described and discussed. The article contains the following items:

1. Introduction.
2. The method.
3. Theory of the method.
4. Method of interpreting the results.
5. Apparatus.
6. Arrangement for experimental survey.
7. Experimental results of survey.
8. Conclusions.

The conclusions drawn by the author read as follows:

1. There is no fundamental disagreement between the values of resistance obtained by the use of the Megger earth-tester and of the potentiometer equipment. Such differences as occur do not exceed 5 per cent except in very isolated cases and can reasonably be attributed to instrumental errors. One item which contributes to this instrumental error is the error in the correction-factor for the commutators, which can not be considered to be less than 3 per cent. There is of course no theoretical reason for expecting any difference between the values obtained with the two sets of apparatus.

2. In the curves of experimental results there are no sudden changes in curvature, with the exception, of course, of those due to the surface variations. This seems to confirm the theory, and also to discredit the method of interpretation which relies on the appearance of sudden changes in curvature in the curves.

3. The application to the experimental results obtained at stations A and B of the method of interpretation based on the theory worked out above gives satisfactory results. There does not appear to be any reason why perfectly satisfying theories should not be developed for various cases of earth structure, and methods of interpretation evolved which are based on these theories. The author is proceeding with the investigation of a rather more complicated type of earth structure with a view to developing further methods of interpretation analogous to that described above.

Five tables and 11 figures illustrate the article.--W. Ayvazoglou.

(582) ÜBER DIE AUSBREITUNG ELEKTROMAGNETISCHER WELLEN HOHER FREQUENZ IM BERGFEUCHTEN GEBIRGE. ZUR FRAGE IHRER GEOELEKTRISCHEN ANWENDBARKEIT

(ON THE EXPANSION OF ELECTROMAGNETIC WAVES OF HIGH FREQUENCY IN MOUNTAIN REGION CONTAINING GROUND WATER. CONTRIBUTION TO THE QUESTION OF THEIR GEOELECTRIC APPLICATION)

By W. Stern

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 1, No. 4, 1931, pp. 437-456.

This investigation concerns the applicability of electromagnetic waves of high frequency ($N = 1 - 3.10^7$ Hertz) to prospecting and determining depth of bodies of formations showing a sufficient difference in their electrical conductivities and dielectrical constant as compared with the surrounding strata.

It is shown how the structure and the extension of formations can be determined by measuring direction and amplitude of electromagnetic waves of high enough frequency transmitted through the rocks which propagate sufficiently exactly according to the optical laws. Reflections announce the existence of bodies or formations differing in their electrical conductivities or dielectrical constant as compared with the surrounding strata. For the determination of their depths, methods and mathematic equations are developed for idealized cases.

A detailed description of instruments necessary for emitting and receiving the waves and measuring their elements is given. The arrangement consists of the transmitter and receiver stations. The latter consists of a search frame for measuring the direction of the waves, of a receiver, an amplifier, and a compensation circuit with auxiliary voltage and milliameter for measuring the intensity of the waves.

For the determination of the maximum depth attainable the absorption coefficient of rocks was measured for brown coal in dependence to the frequency used for difference thickness of the material; for other materials it was extrapolated with reference to their specific resistivities. The results obtained are shown in a table. The minimum depth of the stratum prospected for, from which the waves are reflected, is found to be $> 2 \lambda$ of the wave length used. On the basis of these results instruments suitable for practical purposes could be developed. The construction of a transmitter using a circular frame as antenna was successful. Its frequency was $10^7 - 5.10^7$ Hertz; its sending intensity equal to 15 watts. The first transmitter was constructed as a dipol sender of a frequency equal to from $1.5 - 7.5.10^6$ Hertz and had a sending intensity equal to 1.5 watts. Furthermore, the sensitivity of the receiver could be increased considerably.

Characteristic reflections on the surface of the ground water were obtained with those instruments.

A project of an improvement permitting the elimination of measurement errors by an automatically rotating search frame the course of which is determined with respect to time, and the photographic registration of the effect is described.--Author's abstract.

5. RADIOACTIVE METHODS

(583) RADIOAKTIVE UNTERSUCHUNGEN AM SALZDOM VON SPERENBERG

(RADIOACTIVE INVESTIGATIONS AT THE SPERENBERG SALT DOME)

By Friedrich Breyer

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik, Leipzig, vol. 1, No. 4, 1931, pp. 373-419.

A method is developed by which it is possible to measure the vertical distribution of the emanation in the uppermost parts of the soil. The law of the vertical distribution of the emanation in the upper parts of the soil is represented by a hyperbola. After a ventilation of the borehole the process of diffusion takes an average of seven minutes to become quiet. At a depth of 190 centimeters the "breathing of the soil" has been found to be of the same amount as at 25 centimeters. At the Sperenberg salt dome the oscillations of the ionization of daily or longer periods, which are due to the "breathing of the soil," are of the same or even greater amplitude than the differences of ionization due to geological features.

The indications of a higher percentage of emanation due to geological features are situated on lines corresponding to the supposed rim of the salt dome. Indications of lower percentage of emanation correspond to a particular high porosity of the upper-most stratum; they have been found in superficial layers of sand. The apparatus is not adequate for more detailed measurements. The description of another apparatus which will give more accurate results is given.--Author's abstract.

7. UNCLASSIFIED METHODS

(584) L' ÉTUDE DU SOUS-SOL PAR LES MÉTHODES GÉOPHYSIQUES

(STUDYING OF THE SUBSOIL BY GEOPHYSICAL METHODS)

By Ch. Maurain

Recherches et Inventions, Bellevue (S.-et-O.), vol. 12, No. 198, 1931, pp. 65-73.

The application of geophysical methods for studying the subsoil has considerably increased during the last few years, this application being important from both the scientific as well as practical viewpoints.

The purpose of this article is to indicate the principles of these methods and to give some examples of their application. Gravimetric, magnetic, electrical, and seismic methods are discussed and a few examples of their application are given; acoustic and radioactive methods are briefly mentioned. A bibliography relating to geophysical prospecting is added.--W. Ayvazoglou.

(585) LA PROSPECCION DEL PETROLEO POR LOS METODOS GEOFISICOS

(PROSPECTING FOR PETROLEUM BY GEOPHYSICAL METHODS)

By Jose G. Siñeriz

Boletin Minero, Santiago, Chile, vol. 43, No. 385, 1931, pp. 444-451.

A brief discussion of the origin of petroleum and its occurrence in the world precedes the description of geophysical methods of prospecting for oil.

Gravimetrical and seismic methods, their principles, the instruments used, and interpretation of the results of observations obtained are examined.

The article is concluded by some considerations pertaining to the occurrence of petroleum in Spain.--W. Ayvazoglou.

9. NEW BOOKS

(586) American Association of Petroleum Geologists, Tulsa, Okla. Symposium on Geophysics. Price to members, $2.00; nonmembers, $2.50. The book contains geophysical articles published in the November and December "Bulletins."

(587) Congrès International des Mines, de la Metallurgie et de la Géologie appliquée (International Congress of Mining, Metallurgy, and Applied Geology). Session 6, Liège (Belgium), June 22 to 23, 1930. Geological section, 432 pages. The following papers concerning geophysics were presented: (1) Alexanian, C., Topographic corrections with relation to the use of the torsion balance; (2) Ambronn, R., Concerning some important directions for the choice of a special geophysical method for the solution of a given problem and concerning the interpretation of investigations of the soil; (3) Belluigi, A., New ways for studying small deformations of the current lines on the surface of an electrified ground; (4) DeCrandry, G., Geophysical methods of prospecting; (5), Graham, J., and Davis, J., Geothermic gradients in Great Britain; (6) Maikovsky, M., Some results obtained from measuring temperatures in boreholes by means of open-tube thermometers; (7) Merken, M., Note on the distribution of magnetism in Belgium; (8) Neville, E., Communication regarding the application of the Mintrop seismic method to coal measures and mineral deposits; (9) Rothé, E., Interpretation of the results of gravimetrical exploration; (10) Roux, E., The development of instruments for seismic methods of

prospecting; (11) Schlumberger, C., The method of the ground resistivity map and its practical application; (12) Société géophysique de recherche minières, Methods of modern prospection; (13) Sundberg, K., and Nordström, A., Some results of electrical prospecting; (14) Zabelli, A., Concerning geoelectric studies in mines.

(588) Handbuch der Geophysik (Handbook of Geophysics), vol. 2, part 1 (1931), edited by B. Gutenberg. Contains: "Abkuhlung und Temperatur der Erde" (Cooling and Earth Temperature), by B. Gutenberg; "Chemie der Erde" (Chemistry of the Earth), by G. Berg; "Alter der Erde und Geologische Zeitalter" (Age of the Earth and Geological Age), by A. Born; and "Der physikalische Aufbau der Erde" (Physical Structure of the Earth), by B. Gutenberg. Gebrüder Bornträger, Berlin, 564 pp., 183 illus., price, $24.50; price to subscribers to the complete handbook, $16.40.

(589) Handbuch der Geophysik (Handbook of Geophysics), vol. 6, part 1 (1931). Contains: "Eigenschaften der Gesteine" (Properties of Rocks), by H. Reich; "Die elektrischen Aufschlussmethoden" (Electrical exploration methods), by H. Hunkel; "Theorie der gravimetrischen Aufschlussmethoden" (Theory of Gravimetric Exploration Methods), by E. A. Ansal; "Instrumente der gravimetrischen Aufschlussmethoden" (Instruments of gravimetric exploration methods), by O. Meisser. Gebrüder Bornträger, Berlin, 312 pp., 134 illus. Price, $15; price to subscribers to complete handbook, $10.

(590) Heiland, C. A., and Wantland, Dart. A selected list of books and references on geophyscial prospecting. Quarterly of the Colorado School of Mines, Golden, Colo., vol. 26, No. 3, 1931, 24 pp. Price, 50 cents. About 200 items are included in this reference list, the purpose of which is to give to students fairly detailed, yet broad enough knowledge of all phases of geophysical prospecting. The references are arranged according to the following classification: 1. General; 2. Pendulum method of gravitational prospecting; 3. Torsion balance method; 4. Magnetic method; 5. Radioactive method; 6. Geothermal measurements; 7. Acoustic methods; 8. Seismic methods; 9. Electrical methods.

(591) Kossmat, Franz, Prof. Dr. Das Erdbild und seine Veränderungen (Picture of the earth and its changes). Leipzig, 1931, 66 pp. with 6 figures. Price, M. 3. Contents: (1) The material of the earth's crust; (2) The present relief of the earth; (3) Factors of the changes of the picture of the earth; (4) History of the picture of the earth; (5) Comparative tectonic; (6) Theories of the movements of the earth's crust. A brief representation of dynamic geology and its relation to geophysics is given. The last theoretical examination of tectonics is discussed.

(592) Rutherford, Sir Ernest, Chadwick, James, and Ellis, C. D. Radiations from Radioactive Substances. Cambridge University Press, 1930, IX, 588 pp., 140 figures, and 11 tables. Price, 25 shillings.

(593) Wegener, Alfred. Mit Motorboot und Schlitten in Grönland (With motorboat and sled in Greenland). With contributions by Johannes Georgi, Fritz Loewe, and Ernst Sorge. Bielefeld and Leipzig: Velhagen and Klasing, 1930. IV, 192 pp., 73 figures, one map. Price, bound, R.M. 7.00. The book contains results of investigations and measurements on the thickness of ice, carried out by the seismic method.

10. PATENTS

(594) APPARAT ZUM AUFSUCHEN VON BODENSCHÄTZEN, WIE KOHLE, ERDÖL, SALZ, EISENERZ USW., MITTELS AUF DIESELBEN ANSPRECHENDER, IN HORIZONTALER EBENE AUSCHWINGENDER SUBSTANZEN

(APPARATUS FOR DISCLOSING DEPOSITS SUCH AS COAL, OIL, SALE, IRON-ORE, ETC., BY MEANS OF SUBSTANCES INFLUENCED BY THEM AND SWINGING IN HORIZONTAL PLANE)

Friedrich Brannolte of Delmenhorst in Oldenburg.

German Patent 431,329 Patent issued July 7, 1926.

The apparatus consists of a cylindrical box in which a frame, provided with an index and case-holder, is suspended by means of silk threads in such a way that the case can swing in a horizontal plane. Special cases are to be used for discovering different kinds of deposits.

Claims allowed - 1.

(595) KOINZIDENZAPPARAT ZUR PENDELBEOBACHTUNG

(COINCIDENCE APPARATUS FOR PENDULUM OBSERVATIONS)

Askania - Werke A. G., vorm. Centralwerkstatt Dessau
und Carl Bamberg - Friedenau of Berlin-Friedenau.

German Patent 511,838 Patent issued Nov. 4, 1930.

The coincidence apparatus for pendulum observations in which the immovable light-ray thrown upon the pendulum is reflected at fixed intervals by means of a movable element, is characterized by an arrangement in which the movable element forms one part of the comparison watch or is directly connected with one of the movable parts of the latter.

Claims allowed - 3.

(596) VERFAHREN UND VORRICHTUNG ZUR BEHEBUNG DER DURCH RASCHE TEMPERATURVERÄNDERUNG HERVORGERUFENEN STÖRENDEN WIRKUNGEN BEI EÖTVÖSSCHER DREHWAAGE

(METHOD AND ARRANGEMENT FOR ELIMINATING DISTURBING EFFECTS UPON EÖTVÖS TORSION BALANCE CAUSED BY QUICK CHANGES OF TEMPERATURE)

Dr. Stefan Rybár and Dr. Desider Pekár of Budapest.

German Patent 528,187 Patent issued June 26, 1931.

The invention disclosed in this patent concerns arrangements by which the air currents producing disturbing effects inside of the instrument are conducted by means of movable "directing surfaces" secured along the beam in such a way that the stato of equilibrium of the torsion balance is not affected by these air currents.

Claims allowed - 4.

(597) PROCÉDÉ ET APPAREIL POUR LA PROSPECTION ÉLECTROMAGNÉTIQUE DU SOUS-SOL

(METHOD AND APPARATUS FOR ELECTROMAGNETIC PROSPECTING OF THE SUBSOIL)

Société de Prospection électrique (Procédés Schlumberger) residing in France.

French patent 679,817. Patent issued April 17, 1930.

The invention described in this patent concerns a method of prospecting in which the differences of the potential and therefore the differences of specific resistivities in several points of the area under investigation are indicated, producing these differences in the soil by applying to the area a variable magnetic field and measuring the differences of potential produced in the soil by induction. The apparatus for practical carrying out of this method consists of a measuring instrument such as an alternating current voltmeter, an apparatus for direct current combined with a rectifier, potentiometer, or a similar apparatus.

Claims allowed - 1.

(598) PROCÉDÉ POUR PRODUIRE DANS LE SOL DES COURANTS DISSÉMINÉS A CHAMP ÉLECTROMAGNÉTIQUE D'ELLIPTICITÉ QUELCONQUE EN VUE DE L'ÉTUDE DE LA STRUCTURE GÉOLOGIQUE DU SOUS-SOL

(METHOD FOR PRODUCING IN THE SOIL CURRENTS DISSEMINATED BY MEANS OF ANY ELLIPTICAL ELECTROMAGNETIC FIELD FOR THE PURPOSE OF STUDYING THE GEOLOGIC STRUCTURE OF THE SUBSOIL)

Richard Ambronn of Germany.

French Patent 681,670. Patent issued May 17, 1930.

The method described in this patent is characterized by producing an elliptically polarized electromagnetic field serving for exploring the subsoil by means of two systems of alternating current of equal frequency but different phases displaced at a constant and adjustable angle.

Claims allowed - 5.

(599) DISPOSITIF POUR LA DÉTERMINATION COMPLÈTE DE LA DIRECTION ET DE L'INTENSITÉ DE CHAMPS MAGNÉTIQUES, NOTAMMENT DU CHAMP MAGNÉTIQUE NATUREL DE LA TERRE

(APPARATUS FOR A PERFECT DETERMINATION OF THE DIRECTION AND THE INTENSITY OF MAGNETIC FIELDS, ESPECIALLY OF THE NATURAL MAGNETIC FIELD OF THE EARTH)

Richard Ambronn of Germany.

French patent 681,671. Patent issued May 17, 1930.

The instrument described in this patent is based on the principle of Lloyd's balance. The three components of the magnetic field of the earth are determined by compensating with a controllable measurable electromagnetic field the changes of the inclination of a dipping needle which are produced by turning the magnet in several measured angles in the horizontal plane.

Claims allowed - 9.

(600) PERFECTIONNEMENTS APPORTÉS AUX SISMOGRAPHES ET AUTRES INSTRUMENTS DE MESURE

(IMPROVEMENT MADE ON SEISMOGRAPHS AND OTHER MEASURING INSTRUMENTS)

Anglo-Persian Oil Co. (Ltd.), of England.

French patent 686,537. Patent issued July 28, 1930.

The improvements disclosed in this patent concern devices assigned for measuring small displacements or feeble electric currents in seismographs or other measuring instruments. The device comprises a magnet provided with a mirror so that a change in the direction of the magnetic lines produces a rotation of the mirror.

Claims allowed - 7.

(601) SEISMOMETER

Walter O. Snelling and Guy A. Rupp, of Allentown, Pa.,
assignors to Trojan Powder Co., of New York, N. Y.,
a corporation of New York.

United States patent 1,825,554. Patent issued September 29, 1931.

The object of this invention is to provide a seismometer so contructed that the active indicating elements are not affected by the violent air wave produced by the blast. The invention further resides in certain novel features of construction facilitating the operation of setting up the apparatus.

Claims allowed - 7.

(602) APPARATUS FOR EXPLORING FOR ORE

Louis B. Slichter, of Madison, Wisconsin.

United States patent 1,826,961 Patent issued Oct. 13, 1931.

The present invention relates to the detection of conducting orebodies through the use of exploring means disposed within a drill hole or the like. The method comprising the present invention is in essence one of determining the effective or mean electrical conductivity of the material pierced by or located in the vicinity of a drill hole. The apparatus used for this purpose, as described in this patent, consists of an elongated member having four electrodes adapted to connect electrically with the earth surrounding the drill hole, means for applying current to the outermost of said electrodes, means for reversing said current at intervals, and means for measuring the potential between the intermediate electrodes of said four electrodes.

Claims allowed - 3.

(603) METHOD AND MEANS FOR GEOLOGICAL EXPLORATIONS

Frank Rieber, of San Francisco, Calif.

United States patent 1,827,371. Patent issued Oct. 13, 1931.

This invention relates to making use of elastic pressure waves generated at the earth's surface by the aid of explosions. The main object of this invention consists of eliminating disturbing waves, thus securing a stronger response of the receiving system to the pressure waves than to the disturbing waves due to the surface disturbances. The invention concerns a receiver most sensitive to abrupt variations.

Claims allowed - 13.

(604) EÖTVÖS TORSION BALANCE

Stephan Rybár of Budapest, Hungary.

United States patent 1,829,876. Patent issued November 3, 1931.

The invention relates to Eötvös torsion balance and has for its object to reduce considerably its height without lessening the sensitiveness of the balance. In an Eötvös torsion balance, the combination of a pendulum arm with a measuring wire suspended from the arm, a filament fixed to one end of the pendulum arm, a weight suspended from the filament, a weight fixed to the other end of the pendulum arm, a mirror connected to the pendulum arm, a prism adapted to cooperate with the mirror, a light source for throwing light rays onto the prism and the mirror, and a support for a photographic plate below the pendulum arm for receiving light rays projected by the mirror through the prism, the light source and recording apparatus being arranged outside the plane passing through the pendulum arm.

Claims allowed - 1.

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[1] The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is used: "Reprinted from U. S. Bureau of Mines Information Circular 6569."

[2] Senior physicist, U. S. Bureau of Mines.

1. GRAVITATIONAL METHODS

(605) DIE SCHWERE UND GEOLOGIE IN KAUKASIEN

(GRAVITY AND GEOLOGY IN THE CAUCASUS)

By P. Sawicky

Zeitschrift für Geophysik, Braunschweig, vol. 7, No. 7/8, 1931, pp. 318-323.

The existence of a relationship between geology and the course of gravity at various places must be considered an established fact at the present time. This relationship appears especially distinct if the gravity measurements are corrected for isostasy. Various gravimetric characteristics can be establishe for various regions in the Caucasus by using the available data for these regions. The following regions are discussed:

1. The northern Caucasus: Tertiary and post-Tertiary deposits prevail. Small positive anomalies.

2. Region of the Caucasian high mountain chain: Intrusive and crystallin rocks. Large positive anomalies.

3. Caucasia Minor: Intrusive rocks. Large positive anomalies in Armenia and in the southern part of Adjaristan.

4. The basin of the River Rion: Deposits of Paleogene period. Positive anomalies.

5. Basin of the Kura River except its lower course: Mainly post-Tertiary deposits. Small positive anomalies.

6. Black Sea shore: Positive anomalies.

7. Caspian Sea shore and the Shirvan: Tertiary and post-Tertiary deposits. Large negative anomalies.

Concerning the direct comparison of gravimetrical values with the age and densities of various formations, it is established that the values of anomalie become smaller in places where the old and dense rocks are changing into those of a younger age and into rocks less dense.

A further study of the Caucasian structure by means of pendulum methods is necessary. Best results may probably be obtained by carrying out a gravitational survey by means of profiles. An example of such a profile carried out from Tiflis to Vladikavkas is shown in a figure.—Author's abstract translated by W. Ayvazoglou.

(606) SUR QUELQUES MESURES DE LA GRAVITÉ DANS LA REGION PARISIENNE

(CONCERNING SOME GRAVITY MEASUREMENTS IN THE REGION OF PARIS)

By L. Éblé and E. Salles

Comptes Rendus de l'Académie des Sciences, Paris,
vol. 193, No. 17, 1931, pp. 719-720.

Results of relative measurements only are given in this article. The observatory of Paris has been chosen as the station of departure. The measurements were carried out in the summer of 1931 by means of Sterneck's apparatus. Observations were made at the following places:

Observatory of Paris	- 30 observations
Parc Saint-Maur	- 13 observations
Beauvais	- 12 observations
Versailles	- 11 observations

The results of observations and the values of g obtained are shown in a table.--W. Ayvazoglou.

(607) PROSPECTING FOR NEW OIL-BEARING DEPOSITS MUST BE EXPEDITED (IN RUSSIAN)

By B. Kumerov

Vestnik of the Geological and Prospecting Service of U.S.S.R.,
Leningrad, vol. 5, No. 5-6, 1930, pp. 7-9

The necessity of a general magnetic and gravimetrical survey in order to establish the existence of deep tectonic disturbances by which the probability of anticline structures in the upper oil-bearing formations may be expected is emphasized.

Good results in using the gravimetrical method of prospecting in the oil-bearing regions of Emba and Grozny for disclosing salt domes are mentioned.

The importance of the aerial survey in plotting the data of geological observations on the map, and the low cost and quickness of such a survey (about $1 per square kilometer and about 1,000 square kilometers per day) are, according to Kumerov, factors which absolutely must be taken into consideration in prospecting for new oil fields.

In addition to prospecting for oil-bearing regions, the gravitational survey had proved to be of great value also in Krivoy Rog and the Don Basin.--W. Ayvazoglou.

(608) ÜBER DIE GENAUIGKEIT DER MESSUNG MIT DER DREHWAAGE

(ON THE ACCURACY OF TORSION BALANCE MEASUREMENTS)

By Richard Schumann

Zeitschrift für Instrumentenkunde, Berlin, vol. 51, No. 8, 1931, pp. 426-430.

In this article the author gives mathematical consideration to the remainders - that is, the difference between the values observed and those obtained by calculation - in the representation of the observations, if measurements were taken by observing at more than 5 azimuths.--W. Ayvazoglou.

(609) GENERAL CHARACTERISTICS OF THE GRAVITY METHOD OF PROSPECTING ACCORDING TO THE FIELD WORK PERFORMED BY THE FORMER GEOLOGICAL COMMITTEE IN 1925 - 1928

By B. Numerov

Transactions of the Geological and Prospecting Service of the U.S.S.R.,
Leningrad, No. 36, 1931, 154 pp.

Numerov sums up the work done by the Geological Committee since 1924 when he was sent to Germany to get acquainted with the results and organization of the work being done there with the gravitational variometer.

The first part of the book deals with the methodical work and the second with the results of observations.

The articles appearing in this volume have already been printed in various publications.

Following is a list of the articles, with reference to the Geophysical Abstracts in which they were noted:

I. Methodical works:

1. Theoretical cases for the use of gravitational methods in geology, by Numerov (Geophys. Abs. 1).

2. Fundamental formulas for the analysis of torsion balance observations, by Numerov (Geophys. Abs. 31).

3. Normal effect of the earth's ellipsoid upon the derivatives of the gravity potential, by Numerov (Geophys. Abs. 31).

4. Corrections of observations made by means of a torsion balance with respect to topography, by Numerov (Geophys. Abs. 5).

5. Analytical method of calculating the influence of topographic masses, by Numerov (Geophys. Abs. 31).

6. Graphical method of calculating the influence of topographic masses upon the observations made by a torsion balance, by Samsonov (Geophys. Abs. 31).

7. Influence of the extraneous masses upon gravity observations in case of their infinite extension, by Numerov (Geophys. Abs. 31).

II. Results of observations:

1. Results of gravimetric observations on the Shuvalovo Lake in the winter of 1927 and 1928, by Numerov (Geophys. Abs. 10).

2. Gravity observations in the Solikamsk and Berezniaky district in the Northern Urals in 1926 and 1927, by Numerov (Geophys. Abs. 10).

3. Results of the general gravity survey in the Emba district, by Numerov (Geophys. Abs. 10).

4. Results of gravity observations in Krivoy Rog in 1928, by Alexandrov (Geophys. Abs. 31).

5. Results of gravitational observations in the region of Grozny in 1928, by Numerov (Geophys. Abs. 10).

6. Results of gravity observations of 1928 near the Baskunchak Lake, by Numerov (Geophys. Abs. 10).

The book may be obtained from the Geological and Prospecting Service of the U.S.S.R., Leningrad -- 26 Vassily Ostrov, Sredny Prospect No. 72-b. Price, Rouble: 3.50.--W. Ayvazoglou.

2. MAGNETIC METHODS

(610) DR. FILCHNER'S ERDMAGNETISCHE BEOBACHTUNGEN IN ZENTRALASIEN 1926 BIS 1928. BEARBEITET VON O. VENSKE

(DR. FILCHNER'S EARTH-MAGNETIC OBSERVATIONS IN CENTRAL ASIA FROM 1926 TO 1928. REVISED BY O. VENSKE)

By K. Haussmann

Zeitschrift für Geophysik, Brandenburg, vol. 7, No. 7/8, 1931, pp. 355-359.

Haussmann gives a brief description of the earth-magnetic observations carried out by Dr. Filchner from 1926 to 1928 during his 6,000 kilometer journey through China and Tibet. The whole material has been revised by O. Venske. Earth-magnetic elements D, H, and I were measured at 157 stations.

According to the investigations made by Venske concerning the errors in measurements the following results were established: Errors in D were very small and not over 1'; the azimuth error was about 5', thus the mean error of the D value was 6'. The mean error of the horizontal intensity reached 15 γ. The mean error of the inclination values was 4'.

Filchner expects to continue his observations in Central Asia as soon as possible.--W. Ayvazoglou.

(611) ON THE MYSOVSKI IRON-ORE DEPOSIT IN THE BURIAT-MONGOLIAN AUTONOMOUS SOCIALIST SOVIET REPUBLIC (IN RUSSIAN)

By P. J. Kasatkin and S. S. Smirnov

Bulletin of the Geological and Prospecting Service of U.S.S.R., Leningrad, vol. 50, No. 29, 1931, pp. 457-489.

The Mysovski iron-ore deposit is situated between the Levaia (left) Mysovaia River and Pravaia (right) Mysovaia River, about 14 kilometers to the south of Lake Baikal and of the Mysovaia station of the Transbaikalian railway line.

Favorable conclusions regarding this deposit drawn from investigations made since 1897 caused the Central Geological Committee to organize, during the summer of 1928, a magnetometric survey of this region.

The lines of prospecting were chosen at intervals of 20 meters and the observation points along them at intervals of 1 to 10 meters. Tiberg-Thalen's magnetometer and a universal deflectory magnetometer (model of the former Geological Committee) were used.

According to various geological investigations the deposit was supposed to be a "magnetite lode of the type of a bed vein." By the magnetic survey it was established that the orebody consisted of a series of separate ore lenses. Based on the interpretation of the data obtained by the survey, it was also established that the separate deposits have an insignificant thickness relative to their horizontal extension. By taking the figures into account for the evaluation of the ore reserves a conclusion was drawn that the deposits can not be considered as having industrial value.--W. Ayvazoglou.

(612) CONCERNING CALCULATIONS OF COSTS OF GEOPHYSICAL PROSPECTING (IN RUSSIAN)

By A. Strona

Vestnik of the Geological and Prospecting Service of U.S.S.R., Leningrad, vol. 5, No. 7-8, 1930, pp. 18-19.

In this article Strona emphasizes the necessity of keeping records of the costs involved in various methods of geophysical prospecting, as well as of the efficiency of the work resulting from using various kinds of instruments.

A comparison between the work with the deflector-magnetometer constructed by the Geological Committee of the U.S.S.R. and the Tiberg-Thalen magnetometer is given as an example. According to the records from a magnetic survey carried out in 1929 in the region of Krivoy Rog, 976 points were determined during 42 days (23 points per day) by the Geological Committee's magnetometer, and 17,527 points during 172 days (102 points per day) by the Tiberg-Thalen magnetometer. Thus the costs of the survey may be greatly reduced by working with the latter magnetometer.

Detailed records are especially important in working on large scale.

Analyzing the results of magnetic surveys carried out during the years 1927-1930 with the Tiberg-Thalen magnetometer in the region of Krivoy Rog the mean cost for one point of measurement was found to be about 25 cents, depending on the thickness of the network.--W. Ayvazoglou.

3. SEISMIC METHODS

(613) SEISMISCHE BEOBACHTUNGEN BEI STEINBRUCHSPRENGUNGEN

(SEISMIC OBSERVATIONS MADE IN CONNECTION WITH BLASTING IN QUARRIES)

By Bernhard Brockamp

Zeitschrift für Geophysik, Braunschweig, vol. 7, No. 7/8, 1931, pp. 295-317.

Seismic records on blasting in quarries obtained by the Geophysical Institute of Göttingen to 1929 were revised and completed by four new observations made during 1929.

The travel-times were reduced to a common sea level. The influence of the geologic difference of the soil below the stations upon the travel-time was taken into consideration. Notwithstanding this a deviation from the mean time-curve was observed for single stations; this allowed the author to draw conclusions on the local thickness of the overburden of the rocks. The P_2 layer situated below the overburden was determined to be varicose primitive rocks of a thickness of 5 to 7 kilometers. The lower border of the P_2 layer sinks to the south of Göttingen down to 12 kilometers and rises to $7\frac{1}{2}$ kilometers in the southwest and southeast directions.

The velocity of P_2 waves was 5.9 kilometers per second, and of P_3 waves 6.7 kilometers per second. P corresponds to $\overline{P}$, and P_3 to P^* of nearby earthquakes.--Author's abstract translated by W. Ayvazoglou.

(614) PRINCIPLES UNDERLYING THE INTERPRETATION OF SEISMOGRAMS

By Frank Neumann

Coast and Geodetic Survey, Washington, D. C., 1931, 31 pp., 5 plates.

Contents:

1. Some important operation problems (intensity of light spots; focussing; time control; atlas of seismograms).

2. Nature of earthquake vibrations.

3. Elementary wave types, P, S, L.

4. Dependent wave types.

5. Response of seismograph to earthquake vibrations (magnification equation; harmonic magnification illustrated; acceleration equation; effect of damping).

6. Travel-time charts and tables (determination of distance and time of origin from seismological table; graphical determination of distance and time of origin; difficult interpretations; comparison of travel-time table travel time at short distances).

7. Interpretation of seismogram and preparation of report (artifici disturbances--tilting, short period vibrations, wind tremors, convection currents; microseisms; definition of "activity;" precision required in reading times of activities; interpretation of activities when epicenter data are unknown; interpretation of activities when epicenter data are known).

8. Computation of ground displacement and acceleration.

9. Determination of direction of ground movement and azimuth of epicenter.

10. Descriptive illustrations and plates (paths of seismic waves; motion of earth particle in two types of surface wave; nomenclature; travel-time chart; magnification curves; seismograms).

The notes published in this pamphlet are intended to serve as a guide to the seismologist whose task is to supervise the operation of a seismographic station.--W. Ayvazoglou.

(615) COMPARATIVE STUDIES OF EARTHQUAKE MOTIONS ABOVE GROUND AND IN A TUNNEL (PART I)

By Nobuji Nasu

Bulletin of the Earthquake Research Institute, Tokyo, vol. 9, No. 4, 1931, pp. 454-472.

Comparative studies of earthquake motions carried out inside of the Tanna tunnel and above it with a modern seismograph manufactured from stainless steel are described. According to the results of investigations the earthquake motions inside of the tunnel were found to be generally smaller than those on the surface of the ground. The amplitude inside of the tunnel was taken as the unit for comparing that above the ground.

The relation between the ratio of earthquake motions above the ground to that in the tunnel and the period of earthquake are shown in a diagram.

Further studies with modern seismographs for obtaining more data are desirable.

Tables, diagrams, and seismograms complete the article.--W. Ayvazoglou.

(616) CARACTERISTIQUES DES ONDES SEISMIQUES D' APRÈS LES ENREGISTREMENTS ACCELEROMETRIQUES

(CHARACTERISTICS OF SEISMIC WAVES ACCORDING TO THE REGISTRATION OF ACCELERATIONS)

By Mishio Ishimoto

Bulletin of the Earthquake Research Institute, Tokyo, vol. 9, No. 4, 1931, pp. 473-484.

Figures showing the acceleration registration of seismic shocks obtained in the basement of the Earthquake Research Institute in Tokyo and a table revealing the time of their occurrence and the places of epicenters are given. Their general characteristics are discussed.

The following two chapters deal with the periods of the shocks and with their structure.--W. Ayvazoglou.

(617) SEISMOMETRICAL REPORT

By N. Nasu and Ch. Yasuda

Bulletin of the Earthquake Research Institute, Tokyo, vol. 9, No. 4, 1931, pp. 509-513.

The report includes data of perceptible earthquakes originated within a distance of 160 kilometers from Tokyo and felt there, for the period April 1 to June 30, 1931.

For previous report see Geophysical Abstracts No. 32 of December, 1931.--W. Ayvazoglou.

(618) THE INSTRUMENTAL PHASE-DIFFERENCE OF SEISMOGRAPH RECORDS; AN ILLUSTRATION OF THE PROPERTIES OF DAMPED OSCILLATORY SYSTEMS

By F. J. Scrase

Proceedings of the Physical Society, Cambridge, vol. 43, Part 3, No. 238, 1931, pp. 259-273.

A discussion is given of the method of interpretation of the maxima shown on the records of earthquakes during the surface-wave phase. The usual procedure is to treat the waves (which actually appear as beats) as being truly simply harmonic and to apply the formulas which are derived on this assumption. It is shown that, in general, this procedure does not necessarily lead to the correct interpretation. In the case of direct registration the true earth maximum may have occurred one half-period later than the time obtained by the usual correction. With galvanometric registration the maximum may have occurred either one, two, or three half-periods earlier than the time indicated by the usual formula of Galitzin. Some curves are included to illustrate these points, and an attempt is made to obtain a mathematical explanation.

It is shown that there is no easy method of eliminating an ambiguity of one half-period. For direct registration, therefore, the phase-correction at present in use appears to be as good as the one alternative. In the case of galvanometric registration, although there are altogether four forms of phase-correction, the number of alternatives for any particular period can not exceed two. The final recommendation in this case is that the correction suggested by Somville and which is one half-period less than Galitzin's, be adopted for general use.--Author's abstract.

(619) GEOPHYSICAL PROSPECTING WITH EXPLOSIVES AND THE SEISMOGRAPH

Atlas Powder Co., Wilmington, Del., 1931, 40 pp.

This pamphlet has been prepared by the Atlas Powder Co. in collaboration with Dr. J. Brian Eby for the purpose of disseminating information on the history and the background of this new method of exploring for minerals, describing elementary aspects of the theory involved in the use of the seismograph, and providing details on explosives adaptable for this work.

Contents of the book:

1. Foreword.

2. Geophysical prospecting (general idea is given).

3. Historical sketch (development of instruments and theories; description of the mechanical seismograph and electrical seismograph in most common use; aspects of the refraction method and reflection method of geophysical prospecting).

4. Application of seismic methods.

5. Explosives as applied to geophysical prospecting (character of explosives used; their characteristics and properties).

6. Comparison of powders.

7. Methods of planting the charge.

8. Blasting caps and electric method of blasting.

9. Experimental data (seismic velocities in various formations; relation of depth to charge).

10. Future of explosives in geophysical prospecting.

11. Explosives for seismographic work abroad.

12. Conclusions.

13. Glossary of terms used.

Tables and figures are added.-- W. Ayvazoglou.

(620) INVESTIGATION ON THE DEFORMATION OF THE EARTH'S CRUST IN THE TANGO DISTRICT CONNECTED WITH THE TANGO EARTHQUAKE OF 1927

By Chuji Tsuboi

Bulletin of the Earthquake Research Institute, Tokyo, vol. 9, No. 4, 1931, pp. 423-434.

This is a continuation of an article published by the author in the Bulletin of the Earthquake Research Institute, Tokyo, vol. 8, No. 2, 1930, pp. 153-222 (see Geophys. Abs. 18, October, 1930).

The purpose of the present paper is to discuss the results of the fith survey carried out with the support of the Imperial Academy and the Land Survey Department. The levelling route covered by the present survey is shown in a map. The results were compared with those obtained from the fourth post-seismic levelling, and the changes of heights of benchemasses in the Tango district are given in a table.--W. Ayvazoglou.

4. ELECTRICAL METHODS

(621) TOPOGRAPHICAL STUDY OF A HIDDEN BEDROCK SURFACE BY RESISTIVITY MEASUREMENTS

By E. G. Leonardon

The Engineering Journal, Montreal, vol. 14, No. 6, 1931, pp. 331-335.

Before describing the field survey Leonardon discusses briefly the elementary principles underlying the measurements of the specific resistance of large volumes of the ground. The author's summary reads as follows:

> This article describes the results of an electrical exploration carried out in 1929 for the Department of Railways and Canals, in connection with the study of a dam site at Morrisburg, Ont., to obtain further data on the underground contours of the bedrock.
>
> The method adopted was developed by Professor Schlumberger, and depends on the measurement of an electrical field set up in the ground by current passed between two electrodes at the ends of a known base line. Several series of measurements are taken with different lengths and directions of base line, thus determining many equipotential curves from which the average resistivity of the subsoil can be deduced. Most rocks have resistivities of 1,000 to 2,000 ohms per meter-meter square, while clayey formations give corresponding figures of 10 to 400 ohms.
>
> The necessary apparatus is described, and results given for a large series of measurements carried out on both sides of the St. Lawrence River at Morrisburg. Good agreement was obtained between the depths calculated by the electrical method and those measured by actual drilling.

In the conclusion to this article the author shows that the electrical method of prospecting is rapid, economical, and especially applicable at the beginning of a preliminary survey, at which time heavy expenditure can be avoided by careful planning to limit, as far as possible, exploration by drill holes, test pits, and other expensive means.

The work described in this article was performed in 30 working days. During this time 101 depth determinations were made at a cost of less than $4,500.

Five illustrations are added.--W. Ayvazoglou.

(622) EINE ELEKTRODYNAMISCHE METHODE ZUR ERFORSCHUNG DES ERDINNERN

(AN ELECTRODYNAMIC METHOD FOR THE INVESTIGATION OF THE INTERIOR OF THE EARTH)

By H. Löwy

Physikalische Zeitschrift, Leipzig, vol. 32, No. 8, 1931, pp. 337-345.

The article deals with the question of the physical constitution of oil. Experiments carried out by the author in southern California in 1928 are described.

After a brief discussion on the question of whether the soil can be investigated by electrical means in arid regions, the author gives the results of his examinations in various places in California, based on which he draws the conclusion that the oil-theory established by him must be considered to be correct.--W. Ayvazoglou.

(623) SOME EXPERIMENTS RELATING TO GEOPHYSICAL PROSPECTING

By D. C. Gall

Journal of Scientific Instruments, London, vol. 8, No. 10, 1931, pp. 305-313.

The article concerns the Equiquadrature method recently developed by the author. In an introduction to this article, written by A. Broughton Edge, the latter, referring to some difficulties arising in connection with the equipotential line method, mentions that in order to solve these difficulties he proposed to Gall to work out an entirely new problem - that of locating equipotential lines for the out-of-phase field. A method for plotting these lines directly upon the ground was then devised by Gall and it was agreed to call these lines the "Equiquadrature or EQ lines."

In this equiquadrature method two systems of equipotential lines are plotted. The two systems are in time-quadratures, and are called EP and EQ lines. The EP lines are almost identical with the equipotential lines of the older method, but in plotting them the spacing is chosen in known increments of potential. The EQ lines are 90° out of phase with the EP lines, and these also are plotted at known increments of potential. These two line systems represent the entire surface potential phenomena of elliptical polarization in its simplest form. The configuration of the line systems supplement each other in the indication of anomalies.

Experiments made on a model in order to become familiar with typical configurations are described.

The scheme is shown in a figure.--W. Ayvazoglou.

(624) ELECTRICAL SURVEY OF LIMESTONES OF THE BIBI-EIBAT BAY

By V. Melikian

Azerbaijanskoye Neftianoe Khoziaistvo, Baku, vol. 11, No. 9-10, 1931, pp. 104-108.

Melikian's article deals with the application of an electrical submarine survey for establishing geological structures. This work has been carried out in the U.S.S.R. for the first time and, according to the author, may be of great importance in prospecting for oil below the Caspian Sea.

Practical operation of the method is described and illustrated by figures. Difficulties consisted mainly of damages to cables caused by sharp stones. Strong winds and rough sea often reduced the efficiency of the work, as it was difficult to place the cables in the direction required.

The results of the electric measurements are given in a map showing the profiles and lines of equal resistance.

Geological results of the survey are described, and the possibility of the submarine survey of the littoral of the peninsula of Apsheron is discussed.--W. Ayvazoglou.

(625) ELECTRICAL PROSPECTING FOR GOLD VEINS

By Hans Lundberg

The Northern Miner, Toronto, vol. 17, No. 46, January, 1932, p. 4.

A case of the application of a method by using the apparatus known as the "Racom" for the survey of the property of the Metals Development, Ltd., near Woman Lake in western Ontario is described. The work was carried out by running Racom profiles across the supposed strike of the veins and at a depth sufficient to cut below the overburden, which as a rule did not exceed 30 feet.

Other examples of prospecting for quartz veins in Sumatra and of tracing quartz veins in the Philippine Islands in an area where gold mining had been carried on during ancient times are mentioned.

The author concludes that this method has recently been further developed into what is known as the Differential Rate or Change Method; this consists largely of a new way of interpreting the field results, whereby the influence of the overburden is eliminated.--W. Ayvazoglou.

(626) BEMERKUNGEN ZUM GEOELEKTRISCHEN NACHWEIS UND ZUR MIGRATION DES ÖLS

(REMARKS ON THE GEOELECTRIC INDICATION AND ON THE MIGRATION OF OIL)

By J. Koenigsberger

Petroleum Zeitschrift, Berlin, vol. 27, No. 32, 1931, p. 579.

In a brief discussion of the migration of oil the author remarks that this migration, which is not concluded yet, may also be indicated by geoelectric observations. Bad conductors in layers of normal conductivity may be well observed geoelectrically. This was proved by results of experiments made by many scientists and it was recently shown (by Lee and Swartz, U. S. Bureau of Mines, Technical Paper 488) that oil deposits lying close to the surface could be determined according to Wenner's four points method. An error is often made in that geoelectric effects are attributed to productive oil deposits at a depth of from 800 to 1,000 meters. Theoretical calculations show that the deviation of the current can not be caused by layers at depths below 500 meters.

Therefore these deviations are certainly caused by intermediate stations of the oil migration situated above the productive oil deposits.

Some remarks concerning Koenigsberger's viewpoint on the factors influencing the conductivity of sedimentary rocks in oil deposits are made by H. Hedström. Hedström's remarks are answered by Koenigsberger (see Petroleum Zeitschrift, vol. 27, No. 40, 1931, pp. 731-732).--W. Ayvazoglou.

5. RADIOACTIVE METHODS

(627) THE IONIZATION OF THE ATMOSPHERE MEASURED FROM FLYING AIRCRAFT

By D. C. Rose

Canadian Journal of Research, Ottawa, vol. 5, No. 6, 1931, pp. 625-635.

The present paper deals with an attempt to study the variation in the ion content of the air at different altitudes. Author's abstract reads as follows:

> The Gerdian type of atmospheric ionization measuring apparatus was attached to a cabin aeroplane so that the state of ionization of the atmosphere could be studied. The limitations of the apparatus for aeroplane use are discussed. Measurements were taken from ground level to heights of 15,000 feet. The results are plotted in number of ions per cubic centimeter (separate curves for positive and negative) at different altitudes.

The results indicate that at the cloud level there is an abnormal excess of small positive ions and a minimum in the excess of positive ions over negative ions from 4,000 to 6,000 feet higher. This does not include large ions such as charged water drops or dust particles. The observations were taken in regions free from clouds, the cloud level being determined by observations on clouds in the sky, and by relative humidity measurements taken at the same time.

In view of the preliminary nature of the results described, the conclusions drawn must be, according to the author, considered only as tentative and more observations should be made with the potential gradient apparatus as well as ionization measuring equipment.--W. Ayvazoglou.

(628) DETERMINATION OF THE RADIOACTIVITY OF NATURAL WATERS AND SOME RESULTS FOR FLOWING ARTESIAN WELLS

By James A. Hootman

American Journal of Science, New Haven, vol. 22, No. 131, 1931, pp. 453-463.

Based on the fact that traces of radium are to be found in all kinds of ordinary rocks, the author draws the conclusion that nearly all natural springs and well waters will contain electroscopically detectable traces of dissolved radioactive materials, notably the rare inert gases, radium emanation and thorium emanation, which are easily soluble in water. A method for such a "prospecting" for radium is discussed in this article by the author.

Apparatus is described and results of a series of field tests carried out on artesian wells in Mississippi are given.--W. Ayvazoglou.

(629) AURORES POLAIRES ET RAYONS COSMIQUES

(AURORA BOREALIS AND COSMIC RADIATION)

By A. Dauvillier

Comptes Rendus de l'Academie des Sciences, Paris, vol. 193, No. 7, 1931, pp. 348-350.

The well-known relationship between the sun spots, aurora borealis, and magnetic disturbances is of a temporary character. According to more than 100 observations made by Nordenskiöld on the lightning zone, around the magnetic pole, permanent disturbances must be expected also. They may originate from 15.10^9 volt-electrones which are connected with the penetrating radiation. Dauvillier's viewpoint on this question is discussed in the article.--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(630) GEOPHYSICAL PROSPECTING IN 1931

By Donald H. McLaughlin

Mining and Metallurgy, New York, vol. 13, No. 301, 1932, pp. 16-20.

A brief review of the progress in geophysical work during 1931 is given. he author says that although the employment of geophysical methods in the earch for oil and ore has been greatly curtailed during the past year, more ime has been used for perfection of instruments and field methods, for careul analysis of data, and for thorough investigation of the many problems inolved in interpreting physical anomalies in terms of concealed geologic conitions; thus the achievements must be considered significant.

Notable work carried out by companies, States, and private organizations s mentioned and the results are discussed.

Barton's statement on the commercial activities and the results accomplished n the Gulf region forms one paragraph of the article.

Among the numerous publications appearing during the past years, the reort of the Imperial Geophysical Experimental Survey published under the title, The Principles and Practice of Geophysical Prospecting," and edited by A. B. roughton Edge and T. H. Laby, and Memoir 165 of the Canadian Geological Survey ntitled "Studies of Geophysical Methods in 1928 and 1929," are those deserving he highest merit. Activity of the U. S. Bureau of Mines in publishing a umber of papers on current work on geophysics is mentioned.--W. Ayvazoglou.

(631) PRINCIPLES AND PRACTICE OF GEOPHYSICAL PROSPECTING

Editorial note

Queensland Government Mining Journal, Brisbane, vol. 32, No. 376,
1931, p. 366.

This is the title of the Report of the Imperial Geophysical Experimental urvey carried out in Australia and edited by A. Broughton Edge and T. H. Laby. summary of the report is given in this article (see Geophys. Abs. 30, p. 257). -W. Ayvazoglou.

(632) OBSERVATIONS MAGNÉTIQUES ET ÉLECTRIQUES EN SAHARA

(MAGNETIC AND ELECTRICAL OBSERVATIONS IN THE SAHARA)

By C. LeCamus and F. de Saint-Just

Comptes Rendus de l'Academie des Sciences, Paris, vol. 193, No. 15, 1931, pp. 600-601.

The authors describe some magnetic and electrical observations made during their journey in the Sahara in December, 1930, and January, 1931.

The three elements of the earth-magnetic field were measured at the following three stations: Gao, Tanesrouft and Camp Louis Marin(Hoggar). The two las stations are situated in a region where no similar measurements had been made previously. Chasselon's theodolite-compass No. 5 (small model) and Chasselon's dipping needle No. 68 (small model) were used. The results of the measurements are given in a table. The existence of a magnetic disturbance between the 20th and 25th parallels, around the 3d meridian east of Greenwich, has been proved by these observations.

Measurements of the atmospheric electric field were made at the same stations according to Moulin's method.

The following figures are given:

Tanesrouft, 1st series, 26 to 31 volts per meter (December 6, 1930);
Gao, 1st series, 18 to 32 volts per meter (December 13, 1930);
Camp Louis-Marin, 1st series, 16 to 46 volts per meter (January 4, 1931
2nd series, 19 to 31 volts per meter (January 5, 1931
3rd series, 24 to 41 volts per meter (January 6, 1931

--W. Ayvazoglou.

(633) AERIAL SURVEY AND GEOGRAPHIC OBSERVATIONS AS BASES FOR THE FUTURE GEOLOGICAL AND PROSPECTING WORK (IN RUSSIAN)

By B. Numerov

Vestnik of the Geological and Prospecting Service of the U.S.S.R., Leningrad, vol. 5, No. 7-8, 1930, pp. 30-32.

The importance of the aerial survey is emphasized and the procedure for such a survey is described.

The aerial survey should be used, according to the author, in the first place for preliminary surveys carried out by magnetic and gravitational methods.--W. Ayvazoglou.

(634) DIE HAUPTVERSAMMLUNG DER DEUTSCHEN GEOLOGISCHEN GESELLSCHAFT

(GENERAL MEETING OF THE GERMAN GEOLOGICAL SOCIETY)

By Breddin

Glückauf, Essen, vol. 67, No. 48, 1931, pp. 1493-1498.

According to Breddin's report on the general meeting of the German Geological Society, which took place from the 14th to the 17th of September, 1931, the following items on geophysical methods of exploration were discussed:

1. Relative gravity measurements in oil-bearing regions. This paper was presented by Gornich, in which he emphasized the importance of torsion balance and pendulum measurements for the determination of gravity differences in the earth's crust in general, and in particular the value of the measurements for the discovery of salt domes.

2. Results of the regional-magnetic investigations in the Eifel. The report was made by Reich. The results of numerous measurements carried out by Reich in the region of the Rhine Slate mountains with Schmidt's field balance were discussed. An explanation for a magnetic maximum between Bonn and Lenz and a minimum along the Mosel in the region of Coblenz is given. Geological importance of the changes in the intensity of the magnetic field during the last 30 years, as established recently, was mentioned.

3. The results of local magnetic investigations in the volcano region of the Laach Lake were discussed by Ahrens. By the measurements carried out by him in the region of Niedermendig the existence of basalts and basaltic lavas and their extent beyond the places of previous discoveries has been proved. Very strong magnetic disturbances (up to 6,000 γ) were established above the basaltic slags of the old volcanoes in the region of the Laach Lake.--W. Ayvazoglou.

(635) GEOPHYSICAL INSTRUMENTS

Editorial note

Mining and Metallurgy, New York, vol. 13, No. 301, 1932, p. 62.

The note mentions the development made by the American Askania Corporation, Houston, of Askania magnetometers in order to eliminate the temperature effects and consequent delays in field work because of need to determine temperature coefficient of instrument at each step. According to this note the same company has also brought out a 3-pendulum apparatus for commercial as well as scientific purposes in geophysical work of special interest to oil companies.--W. Ayvazoglou.

(636) REFLEXION SENKRECHT ZU FLÄCHEN OPTISCH EINACHSIGER UND ROMBISCHER, STARK ABSORBIERENDER KRISTALLE

(REFLECTION PERPENDICULAR TO SURFACES OF OPTICALLY SINGLE-AXIAL AND RHOMBIC, STRONGLY ABSORBING CRYSTALS)

By J. Koenigsberger

Neues Jahrbuch für Mineralogie, Geologie und Paläontologie,
No. 64 (A), 1931, pp. 107-121.

The author derives some theoretical conclusions on the following three methods for obtaining quantitative values concerning the microscopic investigation of the incidence of perpendicular rays of light:

1. The measurement of reflective capacity carried out by H. Frick on numerous isotropic and anisotropic minerals.

2. The measurement of phase difference of two oscillations perpendicular one to another.

3. The measurement of the anisotropy of the reflection, either directly or by means of separate measurements of the two components.--W. Ayvazoglou.

8. GEOLOGY

(637) SYMPOSIUM ON SALT DOMES

Editorial note

Journal of the Institution of Petroleum Technologists, London,
vol. 17, Nos. 91 and 92, 1932, pp. 251-371.

This article contains papers presented at the 132nd and 133rd general meetings of the Institution of Petroleum Technologists held on January 13 and February 10, 1931, respectively.

It was decided that these meetings be devoted to the presentation of shor summaries of the various papers and to a general discussion of the whole subject. It was also decided that discussion of a geophysical nature should be held on a future occasion as a separate symposium.

The articles presented are as follows:

1. Salt domes of North Germany, by James Romanes. Geological history; the form of the domes and their tectonic relation to the surrounding sediments the mechanics of salt dome formation; and the influence of salt domes on the formation and concentration of petroleum were discussed.

2. Salt-dome depositional and deformational problems, by G. M. Lees. Items concerning the conditions of deposition of saline formations; salt domes of Persia; the tectonics of the Lower Fars of Persia; Palestine-Jebel Usdum; the miocene salt-gypsum series of the Gulf of Suez; the Red Sea salt domes; plasticity of salt; and the mechanism of the uprise of salt masses were reported.

3. Salt domes of Texas and Louisiana Gulf Coast, by Frederick G. Clapp. The author gives outstanding features regarding the Gulf Coast salt domes, such as: Enumeration of domes; general description; stratigraphic relationships; structural relationships; production; manner of discovery; origin; and the "cap rock."

4. Salt domes in Persia, by J. V. Harrison. Attention has been directed almost exclusively to the activities and manifestations of the older salt formation of Persia.

5. Intrusive salt bodies in Coastal Asia, southwestern Arabia, by Arthur Wade. Studies in connection with "salt dome" phenomena carried out in this region are presented by the author.

6. Origin of the salt domes of the Gulf Coastal Plain of the United States, by E. DeGolyer. A brief discussion as to the origin and age of the salt and the associated cap rock is given.

7. Moot points in salt dome theory, by Launcelot Owen. Some problems arising from the study of salt domes are investigated.

8. A contribution to "salt dome" geochemistry, by Murray Stuart. This is a contribution of the author to the knowledge of naturally occurring salt and its chemical and geological idiosyncrasies acquired by him during his work on salt formation in India.

9. Salt occurrences in Egypt, by Harold Dabell. The Egyptian coast of the Gulf of Suez, known as the oil-field region lying between latitude 28.5 and 26.46 and longitude 33.20 and 34, is considered.

The presentation of the papers mentioned above was followed by a discussion.--W. Ayvazoglou.

(638) HOBBS FIELD, LEA COUNTY, NEW MEXICO

By Ronald K. deFord and Edwin A. Wahlstrom

Bulletin of the American Association of Petroleum Geologists,
vol. 16, No. 1, 1932, pp. 51-91.

The Hobbs field is near the southwestern rim of the Llano Estacado. Structure can not be mapped at the surface; the field was discovered by geophysical surveys. The producing structure is an elongated dome. The oil and gas reservoirs are members of that Permian system which occupies the Permian basin of west Texas and southeastern New Mexico. The main reservoir is a porou light-colored limestone about 200 feet thick. The pressure in this reservoir i more than 1,500 pounds per square inch at a depth of 4,150 to 4,200 feet. Beyond the limits of the oil pool the reservoir-rock contains water under corresponding pressure. Porosity (hence initial production) is related to structure, being greatest along the anticlinal crest, less on the flanks, least in wells off structure.

Approximately one-third of the folding occurred shortly after the deposition of the main limestone reservoir and before salt deposition. Almost two-thirds occurred after salt deposition and was probably post-Triassic, certainly pre-Pliocene.--Author's abstract.

9. NEW BOOKS

(639) Conrad, V., and Weickmann, L., Ergebnisse der kosmischen Physik (Results of cosmic physics). Gerlands Beiträge zur Geophysik, Erster Supplementbar 1931, 448 pp. with 243 figs. Akademische Verlagsgesellschaft m.b.H., Leipzig.

Contents of the book: (1) On the problems of the aurora borealis, by Carl Störmer; pp. 1-86, 70 figs. (2) The barometer effect of the penetrating radiation, by W. Kolhörster and L. Tuwim; pp. 87-126, 23 figs. (3) Absorption-coefficient of penetrating radiation, by W. Kolhorster and L. Tuwim; pp. 127-179, 20 figs. (4) The atmospheric ozone, by F. W. Paul Götz; pp. 180-235, 41 figs. (5) On the propagation of the explosion waves in the atmosphere of the earth, by P. Duckert; pp. 236-290, 16 figs. (6) New methods for the determination of the figure of the earth, by F. Hopfner; pp. 291-372, 9 figs. (7) On the dynamics of the forms of movement on the surface of the earth, by F. M. Exner; pp. 373-445, 65 figs. (8) Index of authors, pp. 446-448.

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(643) Tinsley, H., and Co. Geophysical prospecting by electrical methods. Telegraph and Scientific Instrument manufacturers. Werndee Hall, South Norwood, London, S.E. List No. 62, August, 1931. Some of the apparatus (ratiometer, D.C. potentiometer) used for geophysical prospecting by electrical methods is described.

10. PATENTS

(644) VERFAHREN ZUR SEISMISCHEN BODENFORSCHUNG

(METHOD OF SEISMIC EXPLORATION)

Dr. Richard Ambronn of Göttingen

German Patent 521,573. Patent issued March 24, 1931.

This patent discloses a method of seismic exploration by means of elastic waves artificially produced by explosive charges. The charges, which are ignited simultaneously, are arranged in one plane in squares and in such a way that a preferable direction of the effect is obtained. The receiving instruments are placed inside of the cone of the waves.

Claims allowed - 5.

(645) PROCÉDÉ DE PROSPECTION DE LA CRÔUTE TERRESTRE

(METHOD OF PROSPECTING THE EARTH'S CRUST)

Heinrich Löwy of Austria

French patent 657,367. Patent issued May 22, 1929.

The present invention concerns the prospecting of the earth's crust and is characterized by measuring at least two electrical values, one of which (the proper length of the wave of an electrical oscillator, angle of reflection, position of an extreme value of interference) depends, in case of the presence of a conductive layer, only on the distance from this layer, and the other (damping or amplitude of the vibrations of the oscillator) of which depends besides on the nature of the material.

Claims allowed - 5.

(646) MÉTHODE ET APPAREIL SERVANT A MODIFIER LA DISPOSITION DES RADIATIONS D'UN CORPS ET PLUS PARTICULIÈREMENT SON APPLICATION À LA RECHERCHE ET À LA PROSPECTION DU SOUS-SOL

(METHOD AND APPARATUS SERVING FOR MODIFYING THE DISPOSITION OF RADIATIONS OF A BODY, IN PARTICULAR ITS APPLICATION FOR INVESTIGATING AND PROSPECTING OF THE SUBSOIL)

(Invention made by Hugues-Emile-Joseph Roche and
Leon-Marie-Antoine Bidreman)

Société Anonyme Robivir of France (Rhône).

French patent 668,808. Patent issued November 7, 1929.

This invention concerns the method and apparatus by which modifications in the position of the negative electrons and of the free positive ions of a body, and possibly also changes in their velocities and their paths, may be created. Therefore the invention makes it possible to modify the radiations emitted by this body by exposing it to an electrostatic field.

Claims allowed - 2.

(647) PROCÉDÉ ET DISPOSITIF DE RECHERCHES GÉOPHYSIQUES PERMETTANT DE RECONNAÎTRE ET D'EXPLORER LE SOUS-SOL

(METHOD AND APPARATUS OF GEOPHYSICAL PROSPECTING BY WHICH IT IS POSSIBLE TO INVESTIGATE AND EXPLORE THE SUBSOIL)

Mines domaniales de Potasses d'Alsace of France (Haut-Rhin)

French patent 685,487. Patent issued July 10, 1930.

The method of geophysical prospecting disclosed in this patent consists mainly in measuring the earth resistance between two electrodes. The resistance of the earth is calculated from the maximum readings of the voltmeter.

Claims allowed - 3.

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[2] - Senior physicist, U. S. Bureau of Mines.

1. GRAVITATIONAL METHODS

(648) DETERMINATION OF "G" BY MEANS OF THE FREE-SWINGING PENDULUM

By C. H. Swick

Bulletin of the National Research Council, Washington, D. C., No. 78, 1931, pp. 151-166.

After a brief historical review on the discovery of the pendulum and the underlying principles which made possible its use for gravity measurements, the author mentions the absolute determination of gravity by the pendulum constructed by Henry Kater and the improved types of the reversible pendulum developed by Repsold. For the determinations made by the relative method two general types of modern gravity apparatus are described: (1) The older, known as the von Sterneck apparatus (1880), and (2) that known as the Mendenhall, or Coast and Geodetic Survey apparatus, designed in 1890. The latter is simpler and easier to adjust and use; its accuracy is about 0.001 or 0.002 cm. per second^2. Various sources of errors are enumerated. The chief differences between the two apparatus are noted.

A list of books and articles for a more detailed study of the different kinds of pendulum apparatus and methods used in determining gravity is added. --W. Ayvazoglou.

(649) GRAVITY MEASUREMENTS WITH THE EÖTVÖS TORSION BALANCE

By Donald C. Barton

Bulletin of the National Research Council, Washington, D. C., No. 78, 1931, pp. 167-190.

The principles of the Eötvös torsion balance and the theory of its action are described. The distortion of the level surfaces caused by the introductio of a heavy mass causes the rotation of the beam. The curvature and gradient can be calculated from the values of the torque observed at the stations. The effects of topography and hidden irregularities of mass in the soil and subsoil close to the instrument can be avoided by proper choice of the station si or eliminated to a considerable extent by taking measurements at additional stations within a short distance of the station. Under the last two headings the author discusses the units of measurement and variation of gravity.

References written by Baron Eötvös, as well as a series of papers written in English, are added to the article.--W. Ayvazoglou.

(650) GRAVITY DISTRIBUTION

By A. Belluigi

Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik, Leipzig, vol. 1, No. 3, 1931, pp. 227-240.

Analytical and graphical investigations of the distribution of gravity in a deep lying, assymmetrical anticline are discussed.

The errors that may occur in considering relief and gravity and that are due to confusing the effects of variations in the surroundings with anomalous concentration (that is, mineral deposits) are investigated.--W.A.R. Reprinted from Science Abstracts, Sect. A, vol. 34, No. 402, 1931 (469).

(651) MAKE GEOPHYSICAL SURVEYS IN EASTERN MISSISSIPPI

Editorial note

The Oil Weekly, Houston, vol. 62, No. 13, 1931, p. 60.

Considerable geophysical work in Noxubee and Winston Counties, in east central Mississippi, carried on by the Torsion Balance Exploration Co. is reported.

Tests wells are now being drilled, one in Winston County and one in Noxubee County. A party of the Geophysical Research Corporation of Houston has been working recently in various parts of Mississippi.--W. Ayvazoglou.

(652) BRAZORIA COUNTY WILDCAT SHOWS OIL

By Neil Williams

The Oil and Gas Journal, Tulsa, Okla., vol. 30, No. 16, 1931, p. 43.

Williams gives an account of the interest centered on Manvel geophysical salt-dome prospect in northern Brazoria County, discovered in 1929 by torsion balance.--W. Ayvaz[illegible]u.

2. MAGNETIC METHODS

(653) PROGRESS OF WORK IN TERRESTRIAL MAGNETISM OF THE UNITED STATES COAST AND GEODETIC SURVEY, JULY 1, 1927, TO JUNE 30, 1930

By D. L. Hazard

Union géodesique et géophysique internationale, Section de magnétisme et électricité terrestres, Bull. 8, 1931, pp. 76 (I-VII).

Geophysicists employing magnetic methods of prospecting are more and more making use of the results of the work on terrestrial magnetism carried out by the U. S. Coast and Geodetic Survey, which keeps in close touch with the progress of work of the American Geophysical Union and other scientific organizations.

In this article the author gives a brief review of magnetic surveys carried on in the United States, Alaska, Hawaii, and the Philippine Islands. The work of the magnetic observatories, attention given to the improvement of the instrumental equipment of the observatories, and computations made by them are briefly described. A list of publications and articles issued by the U. S. Coast and Geodetic Survey on this subject is added.--W. Ayvazoglou.

(654) REPORT ON THE MAGNETIC INVESTIGATIONS OF THE GEOPHYSICAL INSTITUTE OF LWOW UNIVERSITY DURING THE YEARS 1928-1929

By Edward Stenz and Henryk Orkisz

Kosmos, Lwow, vol. 55, No. 3-4, 1930, pp. 429-443.

Magnetic research work at the Geophysical Institute of Lwow University was initiated in 1928. A detailed magnetic survey of southern Poland to discover local anomalies in the Sub-Carpathian oil region has been carried on since that time.

In this article the authors describe the following work:

1. Investigations in the vicinity of Lwow during the year 1928. Two thousand two hundred and fifty square kilometers was surveyed, the average distance between the stations being 3 kilometers and the number of them 242. Two hundred and fifty measurements were made with a Chasselon inclinometer. The results of these measurements were published by the same authors in 1929, Kosmos, vol. 54, No. 1-2 (see Geophys. Abs. 11).

2. The absolute measurements made during the year 1929. An area of 4,050 square kilometers was surveyed. Two hundred and fifty-one observations of inclination with stations 4 kilometers apart were made. Moreover, on an area of 2,025 square kilometers the horizontal intensity was measured at 65 stations and the declination at 35 stations. A map of inclination in the vicinity of Strij and a map showing the anomalies of inclination in the vicinity of Lwow and Strij are given.

3. Measurements with a Schmidt balance during the year 1929. The 990 points of observation were 1 kilometer apart. A map of horizontal intensity in the vicinity of Drohobycz and Skole is given

4. Remarks concerning the diurnal and annual variations of magnetic elements in Daszawa. The records of the four magnetic elements, D, H, Z, and I, in monthly means for each hour, are given in a table and are graphically represented in four figures.

5. The magnetic work during 1930. Measurements in the Carpathians and the lowland in front of them were carried on. The vertical component

for prospecting purposes was to be measured between the rivers Swica and Lomnica on an area of 1,300 square kilometers.--W. Ayvazoglou.

(655) VARIATIONS SÉCULAIRE DE LA DISTRIBUTION DES ÉLÉMENTS MAGNÉTIQUES

(SECULAR VARIATIONS OF THE DISTRIBUTION OF MAGNETIC ELEMENTS)

By L. Éblé

Annales de l'Institut de Physique de Globe de l'Université de Paris,
Paris, vol. 9, 1931, pp. 87-95.

The author discusses how the determination of the secular variations of ie magnetic elements can be expressed as a function of time, thus making it ossible to calculate these elements for any epoch desired. The usefulness f determining the values of the magnetic elements for a datum chosen in adance for tracing corresponding maps is mentioned especially. Based on these onsiderations, Eblé gives a map of declination in France for the epoch 1931, .--W. Ayvazoglou.

(656) EFFECT OF SUNSPOT CYCLE ON MAGNETIC DIURNAL VARIATION AT APIA

By C. J. Westland

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, Md.,
vol. 36, No. 1, 1931, pp. 6-8.

In this article the data used are the hourly values in magnetic declinaion, D, and horizontal intensity, H, each hourly value having been computed rom the mean ordinate to the curve during the 60 minutes commencing at the reenwich hour stated. The difference between the highest and lowest hourly alue in the day is called simply the "range." Results of harmonic analyses re given, in accordance with the notation:

or $D = m + r_1 \sin (A_1 + t) + r_2 \sin (A_2 + 2t) + \ldots\ldots$ --Author's abstract.

(657) MAGNETIC MAP OF TRI-STATE COMPLETED

By M. D. Harbaugh

Mining and Metallurgy, New York, vol. 13, No. 302, 1932, p. 86.

A magnetometer survey of the Tri-State mining district has recently been ompleted by the Missouri Bureau of Geology and Mines in cooperation with the ri-State Zinc and Lead Ore Producers' Association. Jasper, Newton, and most f Lawrence Counties, Mo.; Cherokee County, Kans.; and Ottawa County, Okla., re included in the map.

Observations of vertical magnetic intensity were made with an Askania alance, and all readings were reduced to an assumed datum tied to the U. S. agnetic station at Mt. Vernon, Mo.

The purpose of the survey was to see what, if any, relationship might be revealed between the geology and location of the many mining fields in the district and the magnetic anomalies in the earth's field. The map does revea very marked anomalies, some of which obviously reflect known geological conditions, especially faulting.

Inquiries regarding the magnetic map may be directed to the secretary of the Tri-State Zinc and Lead Ore Producers' Association, Box 95, Miami, Okla.--W. Ayvazoglou.

3. SEISMIC METHODS

(658) GEOPHYSICAL MEETING ON 1930, NOVEMBER 7

Editorial note.

The Observatory, London, vol. 54, No. 680, 1931, pp. 15-18.

This is the report of a meeting for the discussion of geophysical subjec held on November 7, 1930.

The meeting was opened by a discussion on microseisms. An account of th work of S. K. Bannerji on this subject was given by Sir Gilbert Walker. Some examples of the development of microseisms, taken from Bannerji's work, were discussed; the latter considered that the microseisms were generated at the sea bottom and had their origin in variations of pressure which took place there in connection with storms.

An account of an examination of the Kew seismological traces was given b A. W. Lee, who considered that some of the larger oscillations registered at Kew undoubtedly were due to the shaking of the observatory by wind.

Dr. Jeffreys gave an account on two papers, one dealing with the problem of the damping of a wave set up by a simple shock consisting of a sudden displacement and the second with the "Revision of seismological tables."--W. Ayvazoglou.

(659) COMPARISON OF TWO METHODS FOR INTERPRETATION OF SEISMIC TIME-DISTANCE GRAPHS WHICH ARE SMOOTH CURVES

By Maurice Ewing and L. Don Leet

Transactions American Institute Mining and Metallurgical Engineers, Geophysical Prospecting, 1932, pp. 263-270.

The only time-distance graphs considered in this article are those obtained in localities where the velocity of propagation depends solely on the depth beneath the surface; that is, where there is no slope in the subsurface The authors' summary reads as follows:

1. Smoothly curved time-distance graphs actually are obtained, notably in the Gulf coastal plain sediments.

2. Although it is legitimate to approximate these smooth curves by a number of straight lines for the purposes of calculating depth at a given point or points, it is a serious error to attribute physical significance to the arbitrary set of lines used.

3. The formula, given in this report, for the interpretation of curved time-distance graphs without assuming a law of velocity increase with depth, is easy to apply and gives far more useful and satisfactory results.

The derivation of the formula for treating curved time-distance graphs s given.--W. Ayvazoglou.

(660) LA PROSPÉCTION SEISMIQUE DU SOUS-SOL

(SEISMIC PROSPECTION OF THE SUBSOIL)

By Raymond Maillet and Jean Bazerque

Annales des Mines, Paris, vol. 20, No. 10, 1931, pp. 287-341.

The article is divided into three parts: The first part deals with the echnical principles of seismic prospection, the second with the instruments, nd the third with examples of the application on the terrain. Contents are s follows:

Part 1, Technical principles. (1) General remarks; (2) Horizontal layers; (3) Movable layers lying between two firmer ones; (4) Inclined layers; (5) Other structures; (6) The point of folding formed by two straight lines; (7) Bent branches; (8) Abacuses; (9) Vanishing of deep waves; (10) Ambronn's and Schweydar's curves.

Part 2, Description of instruments. (1) General characteristics; (2) Seismographs; (3) Measuring bridges; (4) Electrical adjustment of seismographs; (5) Recording; (6) Recording of the explosion; (7) Time meters; (8) Unrolling of the film; (9) Arrangement of the instruments at the central registration station.

Part 3, Examples of application on the terrain. (1) Investigation of the foundation layer; (2) Homogeneous terrain; (3) Salt dome.

Twenty-nine figures illustrate the article.--W. Ayvazoglou.

(661) PROPAGATION OF LOVE WAVES

By S. Higuchi

Tohoku University Scientific Reports, Tokyo, vol. 19, No. 6, 1930, pp. 793-800.

Investigates the problem of the propagation of a Love wave along some complex superficial layers of the earth. With the use of rather simple calculations, the conditions of the existence of the wave and of no reflected wave in the regions of the incident wave, etc., are derived.--Author's abstract.

4. ELECTRICAL METHODS

(662) INVESTIGATIONS MADE IN COOPERATION WITH RADIORE COMPANY OF CANADA, LIMITED, SCHLUMBERGER ELECTRICAL PROSPECTING METHODS, AND SWEDISH AMERICAN PROSPECTING COMPANY OF CANADA

By L. Gilchrist and J. B. Mawdsley

Canada Department of Mines, Geological Survey, Memoir 165, 1931, pp. 1-77.

The geophysical exploration companies mentioned above were invited to employ their various methods on one and the same proving ground (the Abana mine) in order to form a just estimate of their possibilities. This article contains seven chapters:

Chapter I. Introduction, by J. B. Mawdsley.

Chapter II. Elementary principles of magnetic, electrical, and electromagnetic methods of prospecting (magnetic methods of prospecting, electrical and electromagnetic methods of prospecting, and fundamental mathematical formulas), by L. Gilchrist.

Chapter III. Geological conditions at the site of the investigation (Abana mines, Quebec), by J. B. Mawdsley.

Chapter IV. Electrical and magnetic conditions at the site of investiga tion (conditions recognizable by a preliminary examination, and conditions re vealed during mining operations on the 300-foot level), by L. Gilchrist.

Chapter V. Magnetic survey of Abana property, by L. Gilchrist.

Chapter VI. Electrical and electromagnetic surveys of Abana property (method of procedure; explorations carried out by the field party of the Radiore Co. of Canada (Ltd.); explorations carried out by the field party of the Schlumberger Electrical Prospecting Methods; explorations carried out by the field party of the Swedish American Prospecting Co. of Canada (Ltd.), by L. Gilchrist and J. B. Mawdsley.

This report is, according to the authors, an attempt to help all who are nterested to understand better the field work of prospecting practice. It s emphasized in the report that only mineral deposits which are distinctly agnetic or electrically conductive can be located by these methods of exploration in their present state of development.

The authors conclude that the geological investigation and the magnetic nd electrical surveys carried out over the Abana mineral deposits show that he physical conditions existing there are complex but that, despite this omplexity, the magnetic and electrical methods of exploration, when used ntelligently, are feasible and productive of valuable results.--W. Ayvazoglou.

(663) GEOPHYSICAL INVESTIGATIONS AT THE MAMMOTH CAVES, KENTUCKY, AND IN SUDBURY BASIN DISTRICT, ONTARIO

By A. S. Eve, D. A. Keys, H. G. I. Watson, J. H. Swartz, and
J. B. Mawdsley.

Canada Department of Mines, Geological Survey, Memoir 165, 1931,
pp. 78-160.

This article forms the second part of Memoir 165. The following items re discussed in its three chapters:

Chapter I. Introduction. Places of carrying out the work and members f the parties in the field are enumerated.

Chapter II. Geological accounts:

1. Geology of the Mammoth Cave region, by J. H. Swartz.

2. Geology of part of the Falconbridge and Errington properties in the vicinity of Sudbury, Ontario, by J. B. Mawdsley.

Chapter III. Investigations in applied geophysics:

1. Radio and electromagnetic waves at Mammoth Cave, Ky., by A. S. Eve and D. A. Keys.

2. Earth resistance methods.

3. The self-potential method.

4. Magnetic surveys.

5. The Bieler-Watson method, by H. G. I. Watson.

Twenty-four tables and 32 figures illustrate the article.--W. Ayvazoglou.

(664) EXPERIMENTS IN ELECTRICAL EXPLORATION MADE IN THE SUMMER OF 1929

By L. Gilchrist

Canada Department of Mines, Geological Survey, Memoir 165,
1931, pp. 161-189.

This report is concerned largely with work carried out at the Abana mine in northwestern Quebec. Some work carried out at the Falconbridge and Errington mines, Sudbury district, Ontario, is discussed because of its relation to similar work at the Abana mine.

The results of the following investigations are presented:

I. Electrical investigations at the Abana mine.

(a) Measurements of resistivity by Wenner-Lee method with a megger.

(b) Measurements of resistivity by the central electrode method (a central current electrode and two end current electrodes) with a megger.

II. Electrical investigations at the Falconbridge mine. Measurements of resistivity by the central electrode method with (1) a megger and (2) a milliammeter and potentiometer.

III. Electrical investigations at the Errington or Treadwell-Yukon mine. Measurements of resistivity by the central electrode method with a milliammete and potentiometer.

IV. Magnetic investigations at the Falconbridge mine and the Errington mine. A magnetometer exploration with the Tiberg magnetometer.—W. Ayvazoglou

(665) ELECTRICAL PROSPECTING

By A. Belluigi

Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik
Leipzig, vol. 1, No. 3, 1931, pp. 241-254.

In calculating the depths of mineral deposits from the results of electrical field observations the chief difficulty is the determination of the lateral dimensions of the deposit.

Approximate solutions can be obtained. Use is made of the relation between the potential and electromagnetic fields, especially fields with a nonelliptical structure. The Biot-Savart formula can be used to calculate the depth of the deposit.—W. A. R. Reprinted from Science Abstracts, Sec. A, vol. 34, No. 402, 1931, p. 469.

(666) A UNIFORM EXPRESSION FOR RESISTIVITY

By Sherwin F. Kelly

Transactions American Institute Mining and Metallurgical Engineers,
Geophysical Prospecting, 1932, pp. 141-143.

In this article Kelly discusses the need for geophysicists to adopt a uniform mode of expressing the electrical resistivity of geological formations. He urges the adoption henceforth, save in exceptional cases, of a standard expression for resistivity.

Examination is made of expressions used by various authors, such as ohms per meter per meter square, ohms per meter meter square, ohms per centimeter per square centimeter, ohms cm. cm.^{2}. In the opinion of the author the last expression provides the clue to a desirable simplification. Writing it out thus: $\frac{\text{ohms}}{\text{cm.} \quad \text{cm.}}2$, and simplifying, ohms x $\frac{\text{cm.}^2}{\text{cm.}}$, the final expression becomes ohms x centimeters.

Resistivities, therefore, can be expressed as ohm-centimeters, ohm-meters, etc. The author concludes: "Therefore, because of its simplicity, the linear relation it emphasizes, and the easily handled figures that result from its use, the recommendation is urgently made that henceforth geophysicists adopt the expression and unit 'ohm-meters' when speaking of electrical resistivities".

This form is already in use by the U. S. Bureau of Standards as the unit in its work on soil resistivity.--W. Ayvazoglou.

(667) EFFECT OF IMPREGNATIC WATERS ON ELECTRICAL CONDUCTIVITY OF SOILS AND ROCKS

By Karl Sundberg

Transactions American Institute Mining and Metallurgical Engineers,
Geophysical Prospecting, 1932, pp. 367-391.

This paper discusses primarily the main factors that determine the electrical conductivity of soils and rocks. As all rocks are more or less porous and as the pores are filled with liquids and gases, their electrical conductivity depends on the following factors:

1. Electrical conductivity of minerals composing the rock.

2. Electrical conductivity of the liquid filling the pores.

3. Proportion of the volume of liquid filling pores of the rocks to the solid rock material.

4. Shape of the pores.

5. Arrangement of the particles of gas and liquids.

6. Temperatures.

The present investigation deals with rocks which have no conducting minerals; therefore, factor 1 is not important.

The liquids contained in soils and rocks in most cases are waters but sometimes are oil. As oil is a nonconductor of electricity, the impregnating waters will determine the electrical conductivity of soils and rocks.

Accordingly the author divides the discussion presented in this paper into the following headings:

1. Occurrence and composition of waters in soils and rocks.
2. Water content of soils and rocks.
3. Determination of electrical conductivity of soils and rocks.
4. Order of magnitude of conductivity of soils and rocks.

Examples of direct determination of the electrical conductivity of rocks by different methods are given. However, as it is generally difficult, or impossible, to determine the electrical conductivity directly the author developed an indirect method to study the conductivity of rocks. The principles of this indirect method are explained.

Tables, diagrams, and 44 references complete the article.—W. Ayvazoglou.

(668) ELECTRICAL CORING; A METHOD OF DETERMINING BOTTOM-HOLE DATA BY ELECTRICAL MEASUREMENTS

By C. and M. Schlumberger and E. G. Leonardon

American Institute Mining and Metallurgical Engineers, New York,
Technical Publication 462, 1932, 38 pp.

The authors have described a series of methods and apparatus which permit tho study of the formations penetrated by drill holes. They gave to the ensemble of these processes the name of "electrical coring" from its analogy with mechanical coring, which has been thus far the only tool at the disposal of the geologist and production engineer to secure subsurface data in drilling exploration.

The process comprises a series of measurements carried out in situ by lowering the measuring apparatus into the drill hole. Thus, numerous bottom-hole data are obtained, namely: The electrical resistivity, the porosity, the temperature of the rocks, the direction of the dip of the formations, the resistivity of the muds, and the inclination and direction of the hole.

In the examination and identification of formations, the use of two physical parameters has been introduced, the electrical resistivity and the porosity. The two parameters, measured inside the hole, make it possible to obtain numerous and reliable stratigraphical conditions. These correlations advantageously replace, in most cases, those obtained with the expensive and slow procedure of mechanical coring.

Strata saturated with oil or natural gas show up very distinctly on the resistivity diagrams on account of their great electrical resistivity and on the porosity diagrams on account of their great permeability. Their identification, therefore, is particularly clear. Furthermore, the numerical value of the resistivity, measured in a given oil-bearing stratum, generally gives a satisfactory idea of its future production. Finally, it is possible, with the use of a simple procedure, to determine the rock pressure inside a porous stratum.--Authors' abstract.

(669) RESULTS OF EARTH RESISTIVITY SURVEY ON VARIOUS GEOLOGIC STRUCTURES IN ILLINOIS

By M. King Hubbert

American Institute Mining and Metallurgical Engineers, New York,
Technical Publication 463, 1932, 23 pp.

Three types of problems were investigated by the earth-resistivity method of Wenner and that of Gish and Rooney: (1) Faults in Paleozoic sediments, (2) gravel deposits and ground-water supply in glacial drift, and (3) anticlines buried beneath glacial drift.

It was found that faults could be discovered, especially if the outcrops on the opposite sides were different or if a considerable shear zone was associated with the fault plane. Some minor faults shown on the geological map that had the same formation outcropping on both sides were not detected.

It was found that major gravel deposits having fairly sharp boundaries, even if full of water and buried under considerable till cover, could be detected readily because of their relatively higher specific resistivity. It was found also that the one buried anticline tested gave a pronounced anomaly, which coincided with the anticlinal axis as independently determined from well-log data. Attempts at precise depth determinations have not as yet been successful.

It seems, therefore, that for the types of problems investigated this method has, in spite of its limitations, demonstrated itself to be a highly useful and economical means of at least doing reconnaissance work and is capable of supplanting, to a large extent, more expensive means of investigation.--Author's abstract.

(670) LOCATION AND STUDY OF PIPE LINE CORROSION BY SURFACE ELECTRICAL MEASUREMENTS

By C. and M. Schlumberger and E. G. Leonardon

American Institute Mining and Metallurgical Engineers, New York,
Technical Publication 476, 1932, 24 pp.

In the past decade numerous scientists and industrial organizations have undertaken extensive investigations of the corrosion of pipe lines. A first result of this work was to bring into evidence the principal laws that seem to condition the chemical corrosion of buried metallic masses, particularly the relations which exist between the corrosion, the corrosiveness of the soil, and its resistivity.

At the same time numerous surveys of pipe lines were performed. They showed that the zones of corrosion are intimately connected with the existence of long-line electric currents flowing through the pipes. In the investigations thus far carried out on the subject, the operators have made their measurements by making direct contacts with the pipe or by effecting the measurements in its immediate vicinity. All of this work required, as a rule, expensive and lengthy excavations.

The authors, taking advantage of the experience acquired during numerous years of electrical prospecting, have approached the problem of corrosion from a new angle and evolved a method and apparatus which permit the survey of pipe lines by electrical measurements carried out at the surface and which do not necessitate any excavating. The zones of corrosion, or "hot spots" of the pipes, can be located under all circumstances, including the often very complicated case offered by the urban pipe-line systems where strong stray currents varying rapidly in time are prevalent.

The apparatus is neither heavy nor cumbersome. It can be operated easily by one or two observers and one helper. Since the measurements are made entirely at the surface, the method is rapid and inexpensive. Already, several extensive investigations of practical and industrial problems have been carrie out with satisfactory results.--Authors' abstract.

(671) INTERPRETATION OF RESISTIVITY MEASUREMENTS

By G. F. Tagg

American Institute Mining and Metallurgical Engineers, New York,
Technical Publication 477, 1932, 13 pp.

This paper deals with a method of interpreting resistivity measurements for the simple case of a single horizontal stratum. The theory of the method is discussed and an experimental survey, carried out by the author to test out this theory, is described. A suitable site where there was a single underlying stratum practically horizontal and where the surface was approximately level was chosen; it was on Cleeve Hill Common near Cheltenham, Gloucestershire. Tests were carried out at two stations. The apparatus consisted of a megger ground tester and a potentiometer-milliammeter equipment with reversing commutators.

Results obtained at both stations are given in diagrams and tables.

The author concludes: "From the experimental results it appears that the method of interpretation based on theoretical considerations given yields satisfactory results when the geological conditions conform to those assumed in the mathematical investigation. It is possible that similar theories and methods of interpretation can be worked out for other forms of geological structure."--W. Ayvazoglou.

5. RADIOACTIVE METHODS

(672) EINE NEUE METHODE ZUR BESTIMMUNG DES EMANATIONSGEHALTES DER ATMOSPHÄRE

(A NEW METHOD FOR THE DETERMINATION OF THE EMANATION CONTENT OF THE ATMOSPHERE)

By W. Messerschmidt

Physikalische Zeitschrift, Leipzig, vol. 32, No. 14, 1931, pp. 548-549.

The method is based on the direct measurement of conductivity of the outside air compressed in the ionization chamber. To measure the emanation content of the atmosphere the outside air is drawn into the ionization chamber by means of a copper tube from a height of 20 meters and compressed to 20 atmospheres. The ionization chamber has a volume of 8 liters and is protected by a 12-centimeter thick lead cover. The ionization current consists of α ionizations of RaEm, RaA and RaC'.

The average accuracy of measurement is about 4 per cent. The results of some tests are discussed. A schematic design of the apparatus is given.--W. Ayvazoglou.

(673) GEIGER-MÜLLER TUBE AS A QUANTITATIVE ION-COUNTER

By J. A. Van den Akker

Review of Scientific Instruments, vol. 1, November, 1930, pp. 672-683.

It was found that the new Geiger-Müller tube is a quantitative detector of individual ions if certain precautions are observed. A bare polished wire along the axis of the tube gives satisfactory results if the resistance and capacity used in the arrangement are given suitable values. The Geiger-Müller tube is quantitative only where the rate of counting is moderate and is particularly accurate where the rate of counting is very low.

The spurious discharges that enter at higher rates of counting seem to be part of the intrinsic nature of the Geiger-Müller tube in its present form; even for large tubes the rate of counting can perhaps never exceed about 300 per minute.

The spurious discharges may be caused by the momentary rise of the field gradient to abnormally high values due to temporary disruptions of the ion layers in a tube.--J. J. Stewart; reprinted from Science Abstracts, Section A, vol. 34, No. 401, 1931.

6. GEOTHERMAL METHODS

(674) REPORT ON FOUR YEARS' STUDY OF EARTH TEMPERATURES IN WELLS

By Charles E. Kern

The Oil and Gas Journal, Tulsa, vol. 29, No. 33, 1931, pp. 54 and 104.

This report, made to the American Petroleum Institute, covers four years of work to indicate a possible method for assisting in the location of oil domes.

The recording of earth temperatures undertaken with the financial support of the American Petroleum Institute has been under the general supervision of Van Orstrand, who initiated, about 10 years ago, the geothermal method for locating oil domes.

Temperature tests taken in approximately 350 oil wells in Texas, Oklahoma, California, and New Mexico have served as foundations for drawing maps and diagrams. They show the relation between temperature and structure in many instances.

The difficulties in interpreting thermal readings are discussed.—W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(675) GEOPHYSICAL SURVEYS OF THE HULL-GLOUCESTER AND HAZELDEAN FAULTS

By A. H. Miller, C. A. French and M. E. Wilson

Canada Department of Mines, Geological Survey, Memoir 165, 1931, pp. 190-225.

In this article the application of the torsion balance to Canadian problems and conditions is discussed in connection with the general problem of methods of geophysical prospecting. The contents are as follows:

Chapter I. Introduction.

Chapter II. Geology of the Ottawa District, by M. E. Wilson.

Chapter III. Torsion balance survey of the Hull-Gloucester and Hazeldean faults (the gradient and the horizontal directing tendency in the case of a fault; results at Leitrum and Hazeldean; and behavior of the instrument), by A. H. Muller.

Chapter IV. Magnetic surveys of the Hull-Gloucester and Hazeldean faults (geological structure; theoretical results; instruments; magnetic results; results at Hazeldean, and local disturbance forces), by C. A. French.

In the conclusion to this chapter French says that there was no positive vidence of a fault at the points indicated by the torsion balance, although here were indications of a discontinuity in the vicinity of the fault and robably associated in some way with it. At Hazeldean, on the other hand, here were definite indications of the existence of a fault. Considering the act that the interpretation of magnetic anomalies is a difficult question it s doubtful is a more definite response could be expected.--W. Ayvazoglou.

(676) THE GEOPHYSICAL DISCUSSIONS

By Sherwin F. Kelly

Mining and Metallurgy, New York, vol. 12, No. 291, 1931, pp. 151-153.

The article contains brief reports on geophysical papers presented at wo sessions held by the Committee of the American Institute of Mining and etallurgical Engineers.

The following papers were discussed:

1. Resistivity measurements upon artificial beds, by J. H. Swartz (Geophys. Abs. 23).

2. Experimental observations of electromagnetic absorption at the Mammoth Cave of Kentucky, by J. W. Joyce (Geophys. Abs. 25).

3. A new development in electrical prospecting, by H. Lundberg and Th. Zuschlag (Geophys. Abs. 25).

4. Electrical exploration applied to geological problems in civil engineering, by E. Leonardon (Geophys. Abs. 24).

5. Mathematical theory of electrical flow in stratified media, by D. Ehrenburg and R. Watson (Geophys. Abs. 24).

6. Analysis of some seismic prospecting field data, by L. Don Leet and M. Ewing. The authors presented some formulas for time-distance curves and emphasized the importance of curved paths of seismic impulses.

7. A magnetic method of estimating the height of some buried magnetic bodies, by A. S. Eve (Geophys. Abs. 24).

8. Discrimination in applying geophysics, by Sherwin F. Kelly (Geoph. Abs. 30).

9. Practical geomagnetic exploration with the Hotchkiss superdip, by Noel H. Stearn (Geophys. Abs. 19).

10. Method for determining the magnetic susceptibility of core samples, by William M. Barret (Geophys. Abs. 24).

11. Geophysical examination of Meteor Crater, Ariz., by J. J. Jakosky, C. H. Wilson and J. W. Daly (Geoph. Abs. 25).

In closing the meeting, McLaughlin, president, voiced a strong request for more papers dealing with the intricacies of interpretating the field readings and with practical illustrations from experience of how conclusions are drawn from the data obtained.--W. Ayvazoglou.

(677) SCIENCE AND PRINCIPLES OF GEOPHYSICS

By C. A. Heiland

Engineering and Mining Journal, New York, vol. 133, No. 1, 1932, p. 48.

In this article Heiland gives three reviews on the following volumes of Dr. B. Gutenberg's Handbuch der Geophysik:

Vol. 3, pt. 1, 570 pp. Berlin: Gebrüder Borntrāger; R.M. 48.00. This volume is chiefly geological.

Vol. 4, pt. 1, 298 pp. Theory of earthquake waves; observations; ground unrests. Berlin: Gebrüder Borntrāger; R.M. 22.00.

Vol. 4, pt. 2, 286 pp. Dr. H. P. Berlage, jr., Seismometer, evaluation of diagrams; Prof. Dr. A. Sieberg, Geology of earthquakes. Berlin: Gebrüder Borntrāger; R.M. 30.00.--W. Ayvazoglou.

(678) LEAST SQUARES IN PRACTICAL GEOPHYSICS

By Irwin Roman

Transactions American Institute Mining and Metallurgical Engineers, Geophysical prospecting, 1932, pp. 460-506.

The method of least squares has been successfully used in practical geophysics to improve the interpretation of the observed data by reducing the effects of inaccuracies in the measurements. This paper discusses problems selected from (1) sound surveying, (2) seismograph reflection exploration, (3) torsion balance surveying.

For each case the general problem is formulated, and the results are applied to numerical data to illustrate the actual forms of calculation.--Author's abstract.

(679) FINDING MINERALS BY PHYSICAL METHODS

By Captain H. Shaw

Discovery, London, vol. 12, No. 136, 1931, pp. 120-124.

The author describes the progress in geophysical methods of prospecting for mineral deposits.

A brief historical outline from the early divining rods, described for he first time in Agricola's "De Re Matallica" (1556), translated by H. oover, is given.

The relation of the physical properties of rocks to the geophysical ethods of prospecting is mentioned, and apparatus used is discussed.--W. yvazoglou.

(680) LES MÉTHODES GÉOPHYSIQUES DE PROSPECTION DU SOUS-SOL

(GEOPHYSICAL METHODS FOR PROSPECTING THE SUBSOIL)

By A. Vigneron

La Nature, Paris, No. 2867, October, 1931, pp. 341-349.

The author gives a description of the principles of geophysical prosecting. Gravimetrical, magnetic, electrical, and seismic methods are disussed and explained by diagrams and photographic pictures of apparatus. eothermal and radioactive methods are mentioned briefly.

In conclusion the author says that only the gravimetrical, magnetic, nd electrical methods have a general application; the seismic method may be apable of giving useful indications but needs to be improved.--W. Ayvazoglou.

(681) APPLICATION OF GEOPHYSICAL METHODS OF PROSPECTING IN THE OIL FIELDS IN AMERICA (IN RUSSIAN)

By B. V. Numerov

Neftianoe Khoziaistvo, Moscow, vol. 21, No. 8-9, 1931, pp. 96-104.

In this article Numerov gives a detailed report on geophysical work arried out in the United States by oil companies. The report is based on nformation obtained by Numerov during his visit here in 1929. The following il-bearing regions are considered: Pennsylvania, Oklahoma and Arkansas, ast Texas, West Texas, the region to the east of the Rocky Mountains (south exas and Louisiana), and California.

According to Numerov's information the number of instruments used for arious geophysical work by the oil companies is as follows: 200 magnetoeters, 150 variometers, and 175 seismographs; also, there are 5 electrical arties and only 1 or 2 pendulum apparatus.

The great success in discovering salt domes is noticed. The increasing pplication of paleontology for studying the geological structure of the arth's crust, especially by oil companies in California, is mentioned.

The following scheme of conducting geophysical work in the U.S.S.R., ased on the experience obtained in the United States, is proposed:

1. Drawing up of maps of oil-bearing regions based on the existing geological maps and on the analogous locations of deposits discovered in the United States and other countries.

2. Aerial survey of single regions on a scale of 1:20,000 and general maps on a scale of 1:100,000, based on astronomic points 50 kilometers apart.

3. General gravitational and magnetic survey.

4. Geological observations and utilization of the existing wells near the anomalous regions.

5. Detailed geophysical survey, gravitational, seismic, and, to a less extent, electrical.

6. Detailed level survey and test drilling in fixed regions.

7. Deep drilling based on geological data and on the resulgs of geophysical prospecting.--W. Ayvazoglou.

(682) CHOICE OF GEOPHYSICAL METHODS IN PROSPECTING FOR OIL REPORTS

By E. DeGolyer

Transactions American Institute Mining and Metallurgical Engineers,
Geophysical Prospecting, New York, 1932, pp. 9-24.

After a brief discussion on geophysical methods in oil finding (magnetic, gravity, electrical, and seismic) the author proceeds to a consideration of the choice of methods. According to his statement there are four major factors to be considered:

1. Usableness of the method. Can it be expected to give its own type of data in the area under consideration?

2. Cost: (a) On a unit-area basis and (b) on a time-operating unit basis.

3. Time-speed of coverage of area.

4. Value of results expected.

An approximate tabulation of costs is given in the following table:

Costs of geophysical surveys

	Crew per month	Costs per station	Costs per acre
gnetic	$1,000	$ 1.30 - $ 1.50	$0.0028
rsion balance ..	4,500	24.00 - 25.00	.0450
ndulum	5,000	30.00 - 40.00	.0720
ectric	6,000	25.00 - 30.00	.0550
ismic-refraction	15,000		.0800
ismic-reflection	12,000	80.00 - 100.00	.1800

In the writer's opinion and experience, and in the present state of de-
lopment of the geophysical methods for areas where the occurrence of oil
ols is controlled by normal folding--anticlines, faulted structures, etc.,--
e results obtained from seismic surveys, reflection method, are more definite
d of greater value than any other type of geophysical information obtainable.

The writer's second choice for all areas and first choice for areas in
ich the seismic methods are not usable is the gravimetric method, generally
torsion-balance survey.

The performance of the electrical methods in the oil industry has not
en impressive.

The results of magnetic surveys are not susceptible of interpretations
fficiently definite in terms of geologic structure to give them any con-
derable value to the oil prospector, except in few very special cases.

In conclusion the author stresses the point that the fundamental and
st important part of all geophysical work is the proper interpretation in
ologic terms of the physical data secured from field observations, that is,
e cooperation between the physicist and the geologist.--W. Ayvazoglou.

(683) MODERN METHODS OF GEOPHYSICAL PROSPECTING

Editorial note

The Rhodesian Mining Journal, Johannesburg, vol. 5, No. 52, 1931,
pp. 491-495.

After a brief account of geophysical methods of determining the presence
minerals and the principles on which the practice is based, the author
scusses various applications of these methods in South Africa. Electrical
d magnetic methods are considered the most suitable ones for South Africa.
vorable conditions for tests and results of geophysical survey at Messina
e described. Effects of geologic anomalies and advantages of electrical
ospecting are examined. The costs of magnetic surveys, under normal condi-
ons and providing the distances between stations are not too great, are
timated to be from 4 s. to 8 s. per station.--W. Ayvazoglou.

(684) SUMMARIES OF RESULTS FROM GEOPHYSICAL SURVEYS AT VARIOUS PROPERTIES

By Donald H. McLaughlin

Transactions American Institute Mining and Metallurgical Engineers, Geophysical Prospecting, 1932, pp. 24-47.

In the introduction to the article, written by McLaughlin, he mentions the desirability of interchanging opinions concerning results from actual cases. In connection with this, McLaughlin gives a few paragraphs from the following letters: (1) Allen W. Pinger's of the New Jersey Zinc Co. on the application of the methods at a number of its properties. (2) J. W. Weitzenkorn's "Success with molybdenite deposits," a summary of the work done at Questa, N. Mex. (3) "Indications in sericite schists," information from L. G. Morrell concerning a geological and electrical survey in a region of sericite schists impregnated with disseminated sulphides. (4) "Reports from Canada," information furnished by George Bury concerning electrical surveys using a high frequency method on two properties in Canada, the Abbey Mines (Ltd.), and the St. Lawrence Metals (Ltd.); by Joseph Errington, of Toronto, on favorable results in the Sudbury Basin; by C. V. Clausen on the failure to secure definite results at the Treadwell-Yukon properties; and by W. H. Emens of the Mining Corporation of Canada concerning results at various properties of this company. (5) Letters on "Limitations of geophysical work" from Robert E. Tally, general manager of the United Verde Copper Co.; Fred Searls of the Newmont Mining Corporation; and J. M. Snow of the Tintic Standard Mining Co.

In the summaries of results from geophysical surveys at various properties the following articles are also included:

1. Kennecott Mines, Alaska, by Alan M. Bateman (Geophys. Abs. 19).

2. Southern British Columbia, by J. J. O'Neill (Geophys. Abs. 19).

3. Gull Lake, North Central Newfoundland, by E. Y. Dougherty (Geophys. Abs. 19).--W. Ayvazoglou.

(685) THE DETECTION OF MINERALIZED DEPOSITS BY GEOPHYSICAL METHODS

By A. G. Boyden

The Mining and Industrial Magazine of Southern Africa, Johannesburg, vol. 12, No. 4, 1931, pp. 109-110.

Prospecting by means of sound waves, earth tremors, and radioactive properties, is mentioned. Electrical methods are considered to be the most successful ones for locating orebodies. The principles of applying (1) the self-potential, (2) the surface-potential, and (3) the inductive methods are discussed briefly. Results of geophysical survey of Northern Transvaal (Messina) are examined.--W. Ayvazoglou.

(686) POSSIBLE NEW FIELD IN CALCASIEU AREA

By Neil Williams

The Oil and Gas Journal, Tulsa, vol. 29, No. 37, 1931, pp. 46 and 180.

Indications of a possible new field on the Gulf Coast, by gas showings n a test in an Iowa geophysical salt-dome prospect in the Calcasieu and efferson Davis Parish line, were given. This Iowa prospect was discovered y seismograph during 1929.

Another new field, although at present not of commercial importance, was pened in Cameron Parish; it was also discovered by seismograph in 1928.

The Mykawa, a torsion-balance salt-dome prospect, is also of interest. t was opened for production during 1929 by a gas well, which later sprayed little oil.--W. Ayvazoglou.

(687) SECOND WELL AT CLEAR LAKE IMPORTANT

By Neil Williams

The Oil and Gas Journal, Tulsa, vol. 30, No. 7, 1931, p. 40.

The author reports on the opening of three new fields (Lockwood, Clear ake; Lake Grand Ecuille, southern Plaquemines Parish; and Bayou Choctaw, berville Parish) in rapid succession. This indicates, according to Williams, he potential possibilities of new production on the Gulf Coast and at the ame time speaks well for geophysical science, to which the discoveries are redited.

Indications of still another new geophysical field on the Iowa prospect, hich straddles the Calcasieu-Jefferson Davis Parish line, is mentioned.--W. yvazoglou.

(688) COAST OPERATORS WATCHING MANVEL

By Neil Williams

The Oil and Gas Journal, Tulsa, vol. 30, No. 17, 1931, p. 39.

The Manvel prospect, discovered by torsion balance in 1929, is approxi-ately 20 miles south of Houston.

The outcome of the drilling test, which promises the opening of another portant new field, is watched with considerable interest.

Another geophysical prospect was definitely proved up as a dome when Pure il Co. drilled into rock salt in its No. 1 Alliance Trust Co., Gueydan, ermillion Parish, Louisiana. Gueydan was discovered by seismograph in 1929. -W. Ayvazoglou.

8. GEOLOGY

(689) DIE SCHWERE AM OSTRAND DES FENNOSKANDISCHEN SCHILDES

(GRAVITY ON THE EASTERN BORDER OF THE FENNOSKANDIAN SHIELD)

By Robert Swinner

Gerlands Beiträge zur Geophysik, Leipzig, vol. 34, No. 3, 1931, pp. 436-472.

The eastern part of the Fennoskandian shield and the adjacent part of the Russian plateau (Finland, northwest Russia, and the Baltic States) show remarkable relations between the geologic structure and the distribution of gravity. Curves of equal gravity anomalies (reduced according to Bouguer), the so-called isogams, were drawn on a geologic map. The result is as follows:

The granites (the Rapakivi massif of Viborg, Aaland, Björneborg, as well as the older granites of Vaasa and Uleaborg) are distinguished by minus gravity, corresponding to the fact that granite, having a smaller specific weight than its surroundings, is a negative disturbing mass. Why the central granite of Finland is an exception is to be investigated more closely.

Moreover, the isogams render very closely the folds that can be distinguished in the structure of the crystalline rocks, especially in the Karelian and southern Finnish mountains; therefore, from the further direction of these isogams a conclusion can be drawn on the continuation of these mountain structures under the Russian plateau. According to this, the Karelian mountains would continue as follows: By one branch towards the Lower Dvina, bordering the "Block of the White Sea"; by another branch, in a sigmoid turn northwards around Lake Ilmen, to the "Wall of Vishny-Volochek. From the Southern Finnish Mountains a connection in the form of a curve leading from the southwestern point of Finland across Esthonia and the Duna district towards the "Scythic Wall" can be supposed.

On the other hand, a connection between the distribution of gravity (represented by the isogams) and the quarternary uplift (represented by the isobases = lines of equal uplift) can scarcely be proved.--Author's abstract translated by W. Ayvazoglou.

(690) EAST HACKBERRY SALT DOME, CAMERON PARISH, LOUISIANA

By A. J. Bauernschmidt

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 15, No. 3, 1931, pp. 247-256.

The East Hackberry salt dome, Cameron Parish, Louisiana, was discovered in 1926 by means of the seismograph.

It is a knob on a large salt mass which includes West Hackberry. Most f the oil is produced from Miocene sands that are approximately 3,900 feet n depth, but the producing sands overlying the cap rock are probably liocene.

The oil (18° - 24° Bé gravity) occurs in a narrow zone on the south lank of the dome and in a small area overlying the cap. The initial pro-uction of the wells ranges from 25 to 3,000 barrels of oil per day, and rom 1927 to the end of 1930 a little more than 2,000,000 barrels of oil has een produced from 35 wells.--Author's abstract.

(691) THE GEOLOGY AND ORE DEPOSITS OF BUCHANS, NEWFOUNDLAND

By W. H. Newhouse

Economic Geology, Lancaster, Pa., vol. 26, No. 4, 1931, pp. 399-414.

A geological description of ore deposits of Buchans found by geophysical rospecting is given.

The history of the discovery of the orebodies has been discussed in the ollowing papers:

1. Lundberg, H., "Recent results in electrical prospecting for ore." Volume on Geophysical Prospecting, Am. Inst. Min. and Met. Eng., pp. 118-122.

2. Snelgrove, A. K., "The geology of the central mineral belt of Newfoundland." Canadian Min. and Met. Bull. 197, 1928, pp. 1057-1127. --W. Ayvazoglou.

9. NEW BOOKS

692) American Institute of Mining and Metallurgical Engineers, Transactions. Geophysical Prospecting, 1932. Published by the Institute at the office of the secretary, 29 West 39th Street, New York, N. Y. This volume is the second of a series devoted to papers and discussions on geophysical prospecting. The two volumes are as follows: 1929, Geophysical Prospecting; 1932, Trans. Am. Inst. Min. and Met. Eng., Geophysical Prospecting. This volume contains papers and discussions presented at the New York meetings in February, 1929, 1930, 1931, and 1932. Contents: General: Choice of geophysical methods in prospecting for oil deposits, by E. DeGolyer (Geophys. Abs. 35); Summaries of results from geophysical surveys at various properties (Geophys. Abs. 35). Resistivity methods: A new development in electrical prospecting, by Hans Lundberg and Theodor Zuschlag (Geophys. Abs. 25); Geophysical examination of Meteor Crater, Ariz., by J. J. Jakosky, C. H. Wilson, and J. W. Daly (Geophys. Abs. 25); Electrical exploration applied to geological problems in civil engineering, by E. G. Leonardon (Geophys. Abs. 24); Applying the megger ground tester in electrical exploration, by Bela Low, Sherwin F. Kelly, and William B. Creagmile (Geophys. Abs. 32); Depth of

investigation attainable by potential methods of electrical exploration, by C. and M. Schlumberger (Geophys. Abs. 12); Electrical studies of the earth's crust at great depths, by C. and M. Schlumberger (Geophys. Abs. 12); A uniform expression for resistivity, by Sherwin F. Kelly (Geophys. Abs. 35).

Electromagnetic methods: Mapping oil structures by the Sundberg method, by Theodor Zuschlag (Geophys. Abs. 12); Absorption of electromagnetic induction and radiation by rocks, by A. S. Eve (Geophys. Abs. 12).

Magnetic methods: Practical geomagnetic exploration with the Hotchkiss Superdip, by Noel H. Stearn; A magnetic method of estimating the height of some buried magnetic bodies, by A. S. Eve (Geophys. Abs. 24); A method for determining magnetic susceptibility of core samples, by William M. Barret (Geophys. Abs. 24).

Seismic methods: A new geophone, by C. A. Heiland (Geophys. Abs. 17); Seismic propagation paths, by Maurice Ewing and L. Don Leet (Geophys. Abs. 10); Comparison of two methods for interpretation of seismic time-distance graphs which are smooth curves, by Maurice Ewing and L. Don Leet (Geophys. Abs. 35).

Gravitational methods: Interpretation of gravitational anomalies, I, by H. Shaw (Geophys. Abs. 5); Interpretation of gravitational anomalies, II, by H. Shaw (Geophys. Abs. 17).

Theoretical studies: Effect of impregnating waters on electrical conductivity of soils and rocks, by Karl Sundberg (Geophys. Abs. 35); A theoretical study of apparent resistivity in surface potential methods, by J. N. Hummel (Geophys. Abs. 25); Mathematical theory of electrical flow in stratified media with horizontal, homogeneous, and isotropic layers, by D. O. Ehrenburg and R. J. Watson (Geophys. Abs. 24); Observed and theoretical electromagnetic model response of conducting spheres, by L. B. Slichter (Geophys. Abs. 15); Least square in practical geophysics, by Irwin Roman (Geophys. Abs. 35).

(693) Maurain, Ch. Annales de l'Institut de Physique de Globe de l'Université de Paris et du Bureau Central de Magnétisme Torrestre, vol. 9, 1931, 206 pp. Paris, Presses Universitaires de France, 49, Boulevard St.-Michel. Contents of the book: (1) Magnetic observations made in Val-Joyeux during 1929, by L. Éblé; (2) Magnetic observations made at the observatory in Nantes during 1929, by E. Tabesse; (3) Anomalies of the terrestrial magnetic field in France, by E. Mathias, Ch. Maurain, L. Éblé and Miss G. Homery; (4) Magnetic measurements in the Hautes-Pyrénées, le Gers et la Haute Garonne, by E. Mathias; (5) Magnetic measurements in the Haute-Marne, the Cote-d'Or and the Aube, by E. Mathias; (6) Magnetic measurements in the Allier and the Puy-de-Dome, by E. Mathias; (7) Magnetic measurements in the Creuse, the Dordogne, and the Haute-Vienne, by E. Mathias; (8) Secular variations of the distribution of magnetic elements; application for tracing maps, by L. Éblé; (9) Study on the variation of the declination in France since 1681, by Miss G. Homery; (10) Remarks on the combination of the difference, by H. Labrouste; (11) On the periodic displacements of the stationary mass of Wiechert's seismograph, by L. Génaux and R. Guilhen; (12) Actinometric studies according to the documents obtained from the Parc Saint-Maur Observatory, by C. E. Brazier;

(13) Actinometric observations made at the Parc Saint-Maur Observatory in 1929, by C. E. Brazier; (14) Summary of meteorological observations made at the Parc Saint-Maur Observatory in 1929, by C. E. Brazier; (15) Summary of seismic observations made at the Parc Saint-Maur Observatory in 1929, by C. E. Brazier and L. Génaux; (16) Electric charge sustained by the air, by E. Salles; (17) Magnetic observations made at the Observatory of Tananarive (Madagascar) during 1929, by Poisson and Delpeut; (18) On the superficial transversal waves (Love-waves), by J. Coulomb; (19) Measurements of electric conductivity in the atmosphere of Paris, by Mrs. F. Bayard-Duclaux; (20) Magnetic observations in Syria. Observations on electric field and on the deprivation in Syria, by J. Chevrier; (21) Principal magnetic perturbations in 1929 (graphics obtained from register lists in Val-Joyeux).

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DEPARTMENT OF COMMERCE - BUREAU OF MINES

GEOPHYSICAL ABSTRACTS[1]

No. 36

Compiled by Frederick W. Lee[2]

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[1] The Bureau of Mines will welcome reprinting of this paper, provided the following footnote acknowledgment is used: "Reprinted from U. S. Bureau of Mines Information Circular 6620."

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1. GRAVITATIONAL METHODS

(694) DIE BEDEUTUNG DER FINNISCHEN SCHWEREMESSUNGEN FÜR DIE ANGEWANDTE GEOPHYSIK

(THE IMPORTANCE OF FINNISH GRAVITY MEASUREMENTS FOR APPLIED GEOPHYSICS)

By H. Reich

Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik, Leipzig, vol. 2, No. 1, 1931, pp. 1-13.

The possible causes of the Finnish gravimetric disturbances, as made known by U. Pesonen, are discussed. The distance of the regions of the Rapakivi granites and of the Central granites, as well as the Graben-regions with broken tectonics usually has a negative sign. Positive disturbances are registered along the line of magmatites of the old post-Bothnic (archean) fold rocks. In addition to these local anomalies the gravity picture is influenced, it seems, by the regional isostatic movements (ice-isostatics). The practical importance of these facts for the interpretation of gravity anomalies is emphasized.--Author's abstract translated by W. Ayvazoglou.

(695) ERGEBNISSE VON SCHWEREMESSUNGEN BEI DORSTEN (WESTFALEN)

(RESULTS OF GRAVITY MEASUREMENTS NEAR DORSTEN (WESTPHALIA))

By O. Barsch

Gerlands Beiträge zur Geophysik, Erganzungshefte für angewandte Geophysik, Leipzig, vol. 2, No. 1, 1931, pp. 14-21.

The author makes an attempt to establish, by means of torsion-balance measurements, the more or less important disturbances in the Rhine-Westphalia coal basin manifested from about 500 to 600 meters below the younger overburden as well as to mark their limits.

In this preliminary work the author discusses the possibility of such a determination without knowing the specific gravity difference. Based on the torsion-balance investigations it was shown that these disturbances could be clearly recognized from the map of gradients.--Author's abstract translated by W. Ayvazoglou.

(696) PENDEL UND SCHWINGUNGSDAUER-BEOBACHTUNGSVERFAHREN

(PENDULUM METHOD AND METHOD OF OBSERVING THE PERIOD OF OSCILLATION)

By O. Meisser

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 2, No. 2/3, 1931, pp. 131-204.

This is the first part of the article published in the same number of the "Ergänzungshefte" under the common title "Beobachtungsverfahren und Apparaturen ür sehr genaue relative Schwere-und Zeitmessungen" (method of observation and pparatus for very accurate relative gravity and time measurements). The ontents of this part are as follows:

1. Sphere of application of the pendulum.
2. The geometric form of the pendulum.
3. The minimum pendulum.
4. Movable masses on the pendulum.
5. Adjustment of pendulums.
6. The knife-edge of the pendulum.
7. The temperature coefficient.
8. The method of observation of the period of oscillation.
9. The pendulum apparatus.

Forty-six figures are added.--W. Ayvazoglou.

(697) DAS PHOTOGRAPHISCHE KOINZIDENZVERFAHREN UND DAS PENDEL ALS ZEITMESSER

(PHOTOGRAPHIC COINCIDENCE METHOD AND THE PENDULUM AS A TIME METER)

By H. Martin

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 2, No. 2/3, 1931, pp. 204-265.

This is the second part of the article published under the common title Beobachtungsverfahren und Apparaturen für sehr genaue relative Schwere-und eitmessungen" (method of observation and apparatus for very accurate relative ravity and time measurements).

Contents of this part:

1. Physical methods of measurement for comparing two periods of oscillations.
2. Generalization of the oscillation method by the coincidence method.
3. Apparatus for automatic recording of coincidences.
4. Evaluation of coincidence curves recorded photographically.

5. Continuous comparison of the time of oscillation of an astronomic pendulum-clock with the time of oscillation of a free-swinging pendulum.
6. Comparison of the time of oscillation of a tuning fork with that of a free-swinging pendulum.
7. Amplitude correction.
8. Influence of a magnetic field upon the time of oscillation of a magnetizable pendulum.
9. Direct determination of the time of oscillation of a tuning form by means of coincidences.
10. The swinging pendulum as a time meter.

The author concludes that, based on a series of examples, he could prove that the pendulum and the photographic coincidence method, in various combinations, by using simple means, are suitable for carrying out time measurements of the highest precision.--W. Ayvazoglou.

(68) DAS FREIE PENDEL ALS ZEITNORMALE ÄUSSERSTER PRÄZISION

(THE FREE PENDULUM AS A TIME-STANDARD OF HIGHEST PRECISION)

By Th. Gengler

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 2, No. 2/3, 1931, pp. 266-307.

This is the third part of the article "Beobachtungsverfahren und Apparatu für sehr genaue relative Schwere-und Zeitmessungen (Method of observation and apparatus for very accurate relative gravity and time measurements).

Contents of the third part:

1. Accuracy in the determination of the unit of time reached so far.
2. Astronomic precision clocks.
3. Application of a free pendulum for time measurements and corrections of it.
4. Chronographs of high precision.
5. Contact arrangement free of mechanical connection.
6. Electrical light-contact for manifold application.

The fourth part of the common article mentioned above contains a list of books (93) relating to the subject discussed.--W. Ayvazoglou.

(699) PARTICOLARI ASPETTI GRAVIMETRICI DI ALCUNI NUCLEI SUBPADANI

(SPECIAL GRAVIMETRICAL ASPECTS OF SOME NUCLEI IN THE LOWER PLAIN OF THE PO)

By A. Belluigi

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 2, No. 2/3, 1931, pp. 308-316.

The author gives new formulas for the calculation of the gradient and rvature with the Eötvös balance; the density differences are considered to e not constant, but a linear or quadratic or cubic function of these differnces is supposed. The calculations are made with cylindrical and rectangular oordinates for a 2 or 3 dimensional space. In the boreholes in the plain of e Po (Italy) the density was found to increase with the depth for the same ratigraphical formation.--W. Ayvazoglou.

2. MAGNETIC METHODS

(700) RESULTS OF SOME MAGNETIC MEASUREMENTS ON DIKES, WITH EXPERIMENTS UPON GEOPHYSICAL DIFFERENTIATION OF NICKEL-ORE DEPOSITS IN THE SUDBURY DISTRICT, ONTARIO, CANADA

By F. W. Lee

U. S. Department of Commerce, Bureau of Mines, Washington, D. C.,
Technical Paper 510, 1932, 18 pp.

The purpose of this paper, according to the author, is to give the results f experimental investigations in the Sudbury region, Ontario, Canada; it may e considered a continuation of Information Circular 6235, Comparative Advanges of Applying Several Geophysical Methods of Prospecting to the Same erritory (see Geophys. Abs. 13).

In this work attention is directed primarily to distinguishing a nickel ebody or vein from other magnetic material existing in the same locality, d some magnetic observations on dikes are given.

Contents of the article;

Mineralogical and geological factors influencing geophysical investigations.
Description of ore vein.
Magnetic measurements.
Mathematical relations concerning dike anomalies: (1) Narrow dikes;
  (2) magnetic effects arising from various portions of dike; (3)
  magnetic intensities measured along traverse line over dike; (4)
  magnetic relations of dikes of considerable width.
Basis for graphic construction of anomalies.
Effect of topography upon magnetic anomalies.
Results of field observations.
Electrical induction methods: (1) Description of apparatus; (2) results
  of observations with exciting coil vertical; (3) exciting coil
  horizontal.

The article is provided with 20 illustrations. Conclusions reached by the author read as follows:

> It may therefore be concluded that the diabase dike may be easily discovered magnetically but offers no reaction to the induction methods. On the other hand, the ore deposit responds equally well to both magnetic and electrical methods of detection. It is therefore unnecessary to follow a diabase dike, as was done with a magnetometer, until it has outcropped to establish its identity.
>
> Very simple graphic relations exist for determining the vertical and horizontal variation of magnetic intensities over the dikes. Even upon very rough premises it is possible to construct a theoretical relation that approximates the observed values closely.
>
> In the determination of depth, more accurate results were obtained where a platform was used than could be computed from the various points on the magnetic curves.

The article is concluded by referring to the bibliography on the subject. --W. Ayvazoglou.

(701) ADDITIONAL NOTES ON OBSERVATIONS OF MAGNETIC ANOMALIES WITH A MAGNETOMETER

By J. G. Koenigsberger

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 36, No. 4, 1931, p. 374.

This additional note concerns Koenigsberger's article published in No. 3, vol. 36, of Terrestrial Magnetism and Atmospheric Electricity (see Geophys. Abs. 33, p. 333). A graph with another abscissae-axis is given, to take the place of that in the previous article (fig. 5).

The curvatures of the profiles for the differences of H and Z against the normal values shown in this graph indicate the depth of the center of the disturbing rock on the first 25 km. of the line to be about 7 to 12 km. between kilometers 15 and 20 for the principal anomaly, and that of a second anomaly to be about 5 km. in the same region between kilometers 15 and 20 -- more probably caused by intrusive basic rocks than tectonics. The same or similar anomaly was detected on the other side of the Rhine by J. Jung and C. Alexanian (Annales Office National des Combustibles Liquides, vol. 6, No. 1, 1931; see Geophys. Abs. 30, p. 245).--W. Ayvazoglou.

(702) CONTRIBUTION A L ÉTUDE DES FAILLES EN PROSPECTION MAGNÉTIQUE

(CONTRIBUTION TO THE STUDY OF DIKES IN MAGNETIC PROSPECTION)

By J. Jung and C. Alexanian

Annales de l'Office National des Combustibles liquides, Paris;
vol. 6, No. 4, 1931, pp. 711-720.

It is generally accepted that a curve calculated from the magnetic isceptibilities of diked terrains represents the anomaly of the vertical mponent of the terrestrial magnetic field above the dikes.

By the study of a number of dikes on the terrain it is shown that this es not agree with the theoretic curve, and that in fact more complex phenomena rm the preponderant part of the anomaly. In the present article examples are ven, and conclusions which are to be taken into consideration during the ospection are drawn. The translation of the authors' conclusions reads as llows:

It is recognized that from the theoretical viewpoint the problem to be lved is a very delicate one. The conclusions are thus limited to the followg three statements:

1. From the magnetic viewpoint a dike can not be considered only a geometric boundary of two separate parts of terrains with different magnetic susceptibility; it produces also by itself disturbing effects.

2. The magnitude of this perturbation appeared to be sufficiently constant and close to one hundred gammas; it is not in a direct relation with either the character of the diked terrain or the magnitude of faulting.

3. In the cases considered in this paper this perturbation is sufficiently considerable to conceal the theoretic anomaly owing to the difference in the magnetic susceptibility of the terrains in contact.--W. Ayvazoglou.

(703) CHARACTERISTICS OF THE DASHKESAN IRON-ORE DEPOSIT BASED ON DATA OBTAINED FROM A MAGNETOMETRIC SURVEY CARRIED OUT IN 1923 AND 1924 (IN RUSSIAN)

By D. Ortenberg

Transactions of the Geological and Prospecting Service of the
U.S.S.R., Leningrad, No. 11, 1930, 38 pp.

This article is divided into three parts: (1) Geological, (2) data obined from the magnetometric survey, and (3) considerations on the calculaon of the ore reserves. The magnetometric survey was carried out with

Tiberg-Thalen's magnetometers. Six and one-half square kilometers were surveyed, and there were 2,400 stations. The purpose of the survey consisted in establishing the contours of the deposit and in verifying them, by geological observations. The results of the investigation are given in a series of maps.

Based on the extent of the ore-bearing areas outlined by the magnetomete survey and taking the average thickness of the ore-bearing stratum of the garnet-magnetite rocks of the northern group as attaining 25 meters, an ore reserve of about 17 million tons is calculated.--W. Ayvazoglou.

(704) A NEW MAGNETIC ANOMALY IS DISCOVERED (IN RUSSIAN)

By A. Strona

Vestnik of the Geological and Prospecting Service, U. S. S. R.,
Leningrad, vol. 6, No. 1-2, 1931, p. 60.

Based on magnetometric survey carried out with Tiberg-Thalen's magnetome a very interesting anomaly was established in the Rognedin region (about 100 k from Briansk and 350 km. from Moscow). The disturbing ore deposits are expec to be at a shallow depth of from 100 to 200 meters.--W. Ayvazoglou.

(705) MAGNETISCHE UNTERSUCHUNGEN BEI BERGGIESSHÜBEL IN SACHSEN

(MAGNETIC INVESTIGATIONS NEAR BERGGIESSHUBEL IN SAXONY)

By Gerhard Neumann

Gerlands Beiträge zur Geophysik, Ergänzungshefte für angewandte Geophysik,
Leipzig, vol. 2, No. 1, 1931, pp. 22-68.

Contents of the article:

A. **Introduction: Reason for Investigation.**
B. Chapter I: Boundaries, geographic position, and geology of the **region under investigation.**
    Chapter II: Carrying out of measurements: (1) Plan of measurements (leading idea of the investigation; single parts of t investigation; distribution of stations); (2) instruments (determination of the constants; reduction of field measurements).
    Chapter III: Physicogeological part: (1) Distribution of the vertic intensity and relations to the underground (general r marks; magnetic rocks inside of the contact area; dis turbances above the ore layers and their continuation continuations of the whole disturbance toward the nor west; comparative measurements in the environs); (2) comparative investigations of the rock magnetism in t region of investigation (method; results).

Chapter IV: On the interpretation of the Martinzecher anomaly:
(1) General remarks; (2) special investigation (considering of cases possible theoretically; practical results of measurements below the ground; calculations); (3) conclusions.

C. Conclusion: Summary of the results.
Literature.

The author's abstract reads as follows:

Magnetic measurements were made in the environs of Berggiesshübel (Saxony). A very extensive positive anomaly was found north of the negative zone, which is known by previous investigations above the main deposit of magnetic iron. It is shown that the positive anomaly is due to magnetite-bearing igneous-metamorphic rocks on top of the granite massif of Markersbach. Samples of magnetic material were tested. In addition to vertical intensity, measurements of horizontal intensity were made. A subsurface investigation shows the polarization of the magnetic zone which is irregular. The large body of magnetite-bearing rocks has probably induced the opposite magnetization in the iron deposit.

Ten figures complete the article.--W. Ayvazoglou.

(706) DIE VERMESSUNG DER ERDMAGNETISCHEN ANOMALIE BEI PR.-EYLAU IN OSTPREUSSEN UND EIN VERSUCH IHRER DEUTUNG

(MEASUREMENT OF THE EARTHMAGNETIC ANOMALY NEAR PR.-EYLAU IN EASTERN PRUSSIA AND AN ATTEMPT AT ITS INTERPRETATION)

By O. Baseler

erlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik,
Leipzig, vol. 2, No. 1, 1931, pp. 69-121.

Earthmagnetic measurements with three Schmidt field balances were made by
e author in 1929 and 1930 near Preussisch-Eylau in East Prussia over a region
about 50 by 50 km.^{2} Z was measured at 309 stations, and H at 124 stations;
was already known. The first part of the article deals with the proper mea-
rements. The accuracy of adjustment of the three instruments used, as well
corrections for temperature and diurnal variations are briefly discussed;
e determination of scale values is examined (1p = 0 28γ for Z, 1p = 0 15γ
r H). The mean error of single measurements was from 15 to 20γ. For the
lculation of the normal field Nippoldt's formula for East Prussia was used.
e system was compared with figures obtained in the North German Survey, for
ppoldt's Wickbold anomaly and for Gross-Raum.

The second part deals with the reasons for the anomaly and with attempts to determine the depths. The disturbances can not be caused either by the diluvium or by the mesozoic or paleozoic layers, thus crystalline subsoil mus be the reason. An attempt to determine the depth was made, based on a sphere and a suitable ellipsoid according to Koenigsberger, with the aid of the inte section point of the disturbance vectors, by the comparison with profiles of cylinders and a level layer; from 3 to 4 km. were established as the most probably value for the nearest depth of the disturbing mass; the value of the susceptibility was found to be equal to 0.05; the uncertainty of all the valu is, of course, pointed out by the author. Comparisons with some other anomalies are also made and Haalck's diagram method is discussed.--Author's abstract translated by W. Ayvazoglou.

(707) MAGNETOMETER SURVEY OF JACKSON AREA

By L. Sboraragen

The Oil and Gas Journal, Tulsa, vol. 30, No. 36, 1932, pp. 14-15 and 83-84.

Considerable publicity on the possibility of obtaining oil and gas in th Jackson area, Mississippi, was given by Oliver Hopkin's report published by t U. S. Geological Survey in Bulletin 641. A few paragraphs from this report, dealing with the surface structure, are mentioned in this article. The autho was called upon to make several small tract surveys in the vicinity of Jackso with the view of determining favorable drilling locations. For this reason the magnetometer survey shows that the readings are more or less grouped in small areas instead of being uniformly distributed throughout the area. The results of the survey are given in a map. Comparing the surface structure ma with the magnetometer survey it can be observed that the use of the magnetome has given additional information with respect to the top of the structure, supplementing the work of the surface geologist.

Comparing the magnetometer survey with the subsurface map it was established that the high (shown in section 15 of the map) indicated with the magnetometer checked closely with the high outlined by the actual drilling.

The comparison of a cross section of the Jackson structure as indicated by the magnetometer results and the actual drilling operations is given in a map.--W. Ayvazoglou.

3. SEISMIC METHODS

(708) SOME NEAR EARTHQUAKES REPORTED IN THE "INTERNATIONAL SEISMOLOGICAL SUMMARY"

By R. Stoneley

Monthly Notices of the Royal Astronomical Society, London,
Geophysical Supplement, vol. 2, No. 7, 1931, pp. 349-362.

The problem raised by the author in this article consists of discovering what use can be made at present of the data supplied by the separate stations nd published in the International Seismological Summary, and whether these rge residuals are explainable.

The following are the headings of the article:

Method and data.
Identification of the different waves.
Improvement of epicenter.
Least square determinations of velocities.
Evidence for a wave of velocity about 7.0 km/sec.

In conclusion Stoneley expresses the hope that Professor Turner's plan of rinting *all* the additional readings will be continued, as their value is clear- indicated by the present investigation.--W. Ayvazoglou.

(709) THE THICKNESS OF THE CONTINENTAL LAYERS OF EUROPE

By Robert Stoneley

Monthly Notices of the Royal Astronomical Society, London,
Geophysical Supplement, vol. 2, No. 8, 1931, pp. 429-433.

Data concerning the periods and group-velocities of Love waves are found measurement of selected seismograms.

To separate the Love waves from Rayleigh waves, records are chosen in ich the waves reach the recording station in an easterly azimuth.

The waves of group-velocities greater than 3.7 km/sec. give 12 km. for e thickness of the granitic layer. If velocities down to 3.5 km/sec. are in- luded, the corresponding thickness of the granitic layer is 13 km.

The inclusion of lower group-velocities would require taking the sedimen- ary layer into account. The measures afford data for studying this effect, t the formulas become much more complicated.--Author's abstract.

(710) THE TIMES OF P AND S AT SHORT EPICENTRAL DISTANCES

By Harold Jeffreys

Monthly Notices of the Royal Astronomical Society, London,
Geophysical Supplement, vol. 2, No. 8, 1931, pp. 399-407.

A recent discussion (The revision of seismological tables; see Geophys. s. 32, p. 313) of the transmission times of closely observed earthquakes, ecorded in the International Seismological Summary, has led to a set of orrections to the existing tables, which appear satisfactory at distances up about 10° and over 25°, but which present some uncertainties in the inter- ediate range. It was hoped that the causes of these would be traced by means a narrower classification, which is carried out in the present paper.

The author's summary reads as follows:

1. Examination of the data contained in the International Seismological Summary, and of Byerly's results for the Montana earthquake, leads to the conclusion that for $\Delta < 25^{\circ}$ the times of transmission for P and S, apart from constant terms, closely fit the formulas

$$T_P = 14.30\,\Delta - 2.00\,(\Delta/10)^3$$
$$T_S = 25.70\,\Delta - 3.50\,(\Delta/10)^3$$

The cube terms are about double those given previously.

2. P and S at stations within this range are usually followed by other pulses at intervals of about 8s. It seems probable that the curious behavior of the S residuals, derived from the "Summary," is due to the reading of one or other of these later pulses for S.

3. The later pulses may be due to internal reflection in the upper layers.--W. Ayvazoglou.

(711) ON THE CAUSE OF OSCILLATORY MOVEMENT IN SEISMOGRAMS

By Harold Jeffreys

Monthly Notices of the Royal Astronomical Society, London, Geophysical Supplement, vol. 2, No. 8, 1931, pp. 407-416.

At a distant point the disturbance takes the form of three movements of S, and Rayleigh type, respectively, each consisting of a single displacement and return; there is no sign of a train of oscillations.

In an actual seismogram the motion is oscillatory throughout. From the arrival of P to the dying away of the coda there is a continual vibration, th later phases being recognizable only by increases in the amount of the moveme of changes in its character. For the surface waves this feature is adequatel explained by dispersion due to the presence of several distinct surface layer But this cause does not contribute to the vibrations that occur before any surface waves have arrived.

This paper discusses the question of whether dispersion in the bodily waves can be of such a character as to explain this motion.

In this article Jeffreys discusses this problem in connection with the heterogeneity of the earth, gravitation between its parts, and possibility of internal friction.

In the paragraph "Reflection in the surface layers" the author says that is investigations exhaust the possibilities of accounting for the oscilla- ions between P and S, or between S and L, by any kind of dispersion in the ody of the earth. All the factors considered lead only to results quantita- ively inadequate. The only suggestion that survives is that the oscillations re due to reflections of the original pulse within the surface layers and are efracted partially into the lower layer at each arrival there.

In the last paragraph of the article Jeffreys gives a mathematical reatise on the spherical distortional pulse.--W. Ayvazoglou.

(712) THE REFLECTED WAVES FROM DEEP FOCUS EARTHQUAKES

By F. J. Scrase

Proceedings of the Royal Society, London, Series A, vol. 132
No. A 819, pp. 213-235.

The effect of an abnormally deep focus on the reflected waves of earth- uakes is considered. In general a number of supplementary reflected waves ay occur and if the focus is sufficiently deep, they should produce definite eparate phases on the records. The times of travel of both the supplementary aves and the more normal waves have been derived for several depths of focus, . G. Knott's paths of longitudinal and transverse waves being taken as a basis.

It is found that the commencements of the additional phases can generally e recognized on the seismograms and that the times of transit are in reason- ble agreement with the calculated times. This, it is considered, is definite onfirmation of the occurrence of deep focus earthquakes. Further, the ppearance of the supplementary reflected waves provides a means of recognizing deep focus earthquake from the records of a single station.

The results of the investigation favor the idea that the initial phase of n earthquake is a direct compressional wave and is not generated by reflection f a distortional wave.--Author's abstract.

(713) SOME EXPERIENCE IN SEISMIC PROSPECTING

By V. Gavrilovich Gabriel

Gerlands Beiträge zur Geophysik, Ergänzungshefte für Angewandte Geophysik,
Leipzig, vol. 2, No. 1, 1931, pp. 122-130.

The author discusses some observations connected with seismic exploration n practice and the conclusions which can be drawn from them. The seismic rial party was made up of five seismographs of Schweidar Mintrop mechanical ype with five radio receiving and transmitting sets. The results obtained re reported as follows:

The study of the values obtained show that up to 100 meters the results from the dropping of a 200-pound mass of lead are more or less comparable in speed and intensity with these from explosives. Also the results show that with a few exceptions there is only a slight deviation in the values of the distances obtained by surveying and by computing from the "Sound Velocity in Air" charts. Unfortunately the difficulties in handling the heavy masses during the field work prohibit, under the present conditions, an extensive use of heavy weights in seismic prospecting. Perhaps the dropping of heavy blocks might be justified in exploration concerned with shallow seated layers or in seismic training parties connected with the universities and geophysical research laboratories.

Tables are added giving data obtained from (1) explosion, (2) dropping of heavy weights, and (3) profile shooting over anticline.--W. Ayvazoglou.

(714) WAVE EQUATION FOR THE CASE OF A HETEROGENEOUS MEDIUM (IN RUSSIAN)

By S. Sobolev

Académie des Sciences de l'U.R.S.S., Publications of the Seismological
Institute, Leningrad, No. 6, 1930, pp. 1-57.

A mathematical discussion relating to the solution of the wave equation in the case of a heterogeneous medium is given.--W. Ayvazoglou.

(715) CONCERNING THE WAVE EQUATION FOR THE CASE OF A HETEROGENEOUS ISOTROPIC MEDIUM (IN FRENCH)

By S. Sobolev

Académie des Sciences de l'U.R.S.S., Publications of the Seismological
Institute, Leningran, No. 2, 1930, pp. 163-167.

A mathematical discussion concerning the wave equation for the special ca of a heterogeneous isotropic medium is given.--W. Ayvazoglou.

(716) EPICENTRAL ZONE OF CRIMEAN EARTHQUAKES (IN RUSSIAN)

By N. V. Rayko

Académie des Sciences de l'U.R.S.S., Publications of the Seismological
Institute, Leningrad, No. 3, 1930, pp. 1-13.

After the disastrous earthquakes in Crimea in 1927 the Seismological Institute established a series of stations for studying earthquakes occurring at small distances from them. Observations were made in Feodosia, Yalta, Simferopol, and Sevastopol. The stations were provided with Nikiforov's horizontal seismographs with optical registration. Two hundred and sixteen earthquakes were registered during the period from March 13, 1928, to October 1, 19 The data obtained are given in tables. A map showing the geographic distribution of the epicenters is added.--W. Ayvazoglou.

(717) SEISMOMETRIC INVESTIGATION OF SEVERAL BRIDGES IN LENINGRAD (IN RUSSIAN)

By N. V. Veshniakov

Académie des Sciences de l'U.R.S.S., Publications of the Seismological
Institute, Leningrad, No. 4, 1930, pp. 1-20.

The following three bridges were investigated: The Lieutenant Schmidt ridge and the Liteyny bridge across the Neva, and the Siniy bridge across the oyka.

Wiechert-Mintrop's, Nikiforov's, and Galitzin's seismographs were used. he results of investigations are shown in diagrams and tables.--W. Ayvazoglou.

(718) INVESTIGATION OF EQUILIBRIUM CONDITIONS OF EARTHERN MASSES UNDER THE ACTION OF SEISMIC FORCES (IN RUSSIAN)

By V. Tsshokher

Académie des Sciences de l'U.R.S.S., Publications of the Seismological
Institute, Leningrad, No. 5, 1930, pp. 1-11.

In this article the author discusses the action of the seismic accelera-ons upon the equilibrium conditions of earth masses, such as embankments, xcavations, etc. Embankments made from sand, loess, and cement were made on special platform to which accelerations of from 100 to 3,500 mm/sec.^{2} were ommunicated.

The author derives a theoretic formula which gives a sufficiently correct stimate of the character of the phenomenon.--W. Ayvazoglou.

(719) ON THE DIFFRACTION OF SPHERICAL ELASTIC WAVES NEAR THE SURFACE OF A SPHERE (IN RUSSIAN)

By S. Sobolev

Académie des Sciences de l'U.R.S.S., Publications of the Seismological
Institute, Leningrad, No. 7, 1930, pp. 1-13.

In this article the author gives a mathematical discussion of the diffrac-ion of spherical elastic wave near the surface of a sphere for the case of ongitudinal waves only.--W. Ayvazoglou.

(720) PLAN QUINQUENNAL DES TRAVAUX DE RECHERCHE SCIENTIFIQUE DE L'INSTITUT SÉISMOLOGIQUE DE l'ACADÉMIE DES SCIENCES DE l'U. R. S. S.

(FIVE-YEAR PLAN OF SCIENTIFIC RESEARCH WORK IN THE SEISMOLOGICAL INSTITUTE OF THE ACADEMY OF SCIENCES OF THE U.S.S.R.)

By P. M. Nikiforov

Académie des Science de l'U.R.S.S., Publications of the Seismological
Institute, Leningrad, No. 9, 1930, pp. 1-27.

In the preface of his book Nikiforov expresses the hope that all scientific institutions similar to the Seismological Institute of the Academy of Sciences in Leningrad, will be interested in the 5-year scheme of seismological research presented and will give critical attention to the subject of this plan, as well as to considerations by which the plan can be made more complete.

The plan is to be carried into effect from October 1, 1929 to September 30, 1933.

The first part of the book deals with the (1) principal purposes of the Seismological Institute, (2) structure of the Seismological Institute, and (3) distribution of seismic stations.

In the second part the thematic plan of the scientific research work of the Seismological Institute is discussed.

The article is concluded by the financial plan. A map of the U.S.S.R. showing the distribution of the first-class stations, and the regional stations over the whole country is added.--W. Ayvazoglou.

(721) ON THE PROPAGATION OF ELASTIC WAVES ALONG THE SURFACE OF SEPARATION OF TWO MEDIA HAVING DIFFERENT ELASTIC PROPERTIES (IN RUSSIAN)

By V. Kupradze and S. Sobolev

Académie des Sceiences de l'U.R.S.S., Publications of the Seismological
Institute, Leningrad, No. 10, 1930, pp. 1-23.

The translation of authors' abstract reads as follows: In his work, On the Propagation of Tremors Over the Surface of Elastic Solid, Sir H. Lamb considered the propagation of the elastic waves along the surface of an elastic space separated by vacuum. The authors of this article studied, based on Lamb's method, the propagation of elastic waves along the surface separatin two media having different elastic properties. Instead of the vacuum a compressible liquid is supposed in which the velocity of the longitudinal waves is smaller than the velocity of the Rayleigh waves in the second medium. The character of the propagation of the elastic vibrations is essentially changed owing to the presence of the second medium.

The combined influence of the two media upon the displacement of molecule of the surface of the elastic body produces a new maximum, the roperties of which are similar to the Rayleigh waves and the velocity of hich is a little smaller than the velocity of the longitudinal waves of he liquid.

In case of a liquid of small density the influence becomes negligible.-- . Ayvazoglou.

(722) ON A LIMITED PROBLEM OF THE THEORY OF THE LOGARITHMIC POTENTIAL AND ITS APPLICATION TO THE REFLECTION OF THE PLANE ELASTIC WAVES (IN RUSSIAN)

By S. Sobolev

Académie des Sciences de l'U.R.S.S., Publications of the Seismological
Institute, Leningrad, No. 11, 1930, pp. 1-18.

The author gives the solution of the following problem: To determine a unction v, harmonic inside of a certain domain and satisfying along the conour l of this domain the following condition:

$$p\ (s)\ \frac{\partial v}{\partial n} + 9\ (s)\ \frac{\partial v}{\partial s} = f\ (s)$$

n which s is the length of the arc of l and n the direction of the normal to l.

This problem may be applied to the investigation of the reflection of ransversal waves for the case in which the angle of incidence is greater than he critical angle of total reflection.--Author's abstract translated by . Ayvazoglou.

(723) ON THE POSSIBILITY OF OBSERVING A MOHOROVICIC PHASE IN THE SEISMOGRAMS OF EARTHQUAKES IN THE CAUCASUS (IN RUSSIAN)

By N. W. Rayko

Académie des Sciences de l'U.R.S.S., Publications of the Seismological
Institute, Leningrad, No. 12, 1930, pp. 1-10.

Mohorovicic phases represented in Tables 1 and 2 of this article by the ymbol P_M have been revealed by the two Leninakan earthquakes of October 22, 926 (seismograms of the first-class station at Baku and second-class station t Piatigorsk). That this phase P_M really represents the Mohorovicic phase s confirmed by the computation of the propagation velocity of the wave P_M reorded in Table 4 (the epicenters and the moments of the beginning of the eninakan earthquakes were computed according to the data obtained from the tations Pulkovo, Sverdlovsk, and Tashkent).

According to Table 4, the mean value of the velocity of V_{P_M} proved to be equal to 5.75 km/sec., whereas the foreign authors have found somewhat smaller values for the velocity of propagation of seismic waves in the surface layer of Central Europe. This may be explained by the fact that the surface layer in the Caucasus is composed of more elastic rocks than those in Central Europe

The Mohorovicic phase was also observed during the Kuban earthquake of April 19, 1926, at the station of Piatigorsk and at the station of Makeevka.--Author's abstract.

4. ELECTRICAL METHODS

(724) GEOPHYSICAL PROSPECTING. RECENT DEVELOPMENTS IN ELECTRICAL INSTRUMENTS

Editorial note

Industrial Australian and Mining Standard, Melbourne, vol. 86,
No. 2220, 1931, p. 376.

This is an editorial report on a paper read by A. S. Eve before the British Association for the Advancement of Science in London on September 25, 1931, in which he presented a comparative study of the three different electrical methods of prospecting and gave a brief description of the methods employed.

The three methods described were the self-potential, the Radiore, and the Gish-Rooney, as well as Lee's modification of the latter.--W. Ayvazoglou.

(725) DISCUSSION ON "THE METHOD OF THE GROUND RESISTIVITY MAP AND ITS PRACTICAL APPLICATIONS"

By C. and M. Schlumberger

The Canadian Mining and Metallurgical Bulletin, Montreal, 1931,
No. 236, pp. 1413-1414.

This is a brief discussion on the article published by C. and M. Schlumberger under the same title in the Canadian Mining and Metallurgical Bulletin of February, 1931, No. 226, pp. 271-294 (see Geophys. Abs. 23, p. 73) --W. Ayvazoglou.

(726) ELECTRIC DIVINING ROD OPENS RICH GOLD MINE

Editorial note

Washington News, February 12, 1932.

According to information received from Skelleftea (Sweden), a valuable gold-bearing ore has been located near Boliden, thanks to a new electrical divining rod. A village has been built at the mine and a smelter set up.

rom 600,000 tons of ore the smelter will extract each year from 10 to 12
ons of gold, twice that amount of silver, and several thousand tons of copper,
ulphur, and arsenic besides.

A description of the principle of the new divining rod is not given.--
. Ayvazoglou.

5. RADIOACTIVE METHODS

(727) LA PROSPECCION GEOFISICA POR EL METODO RADIO-ACTIVO

(GEOPHYSICAL PROSPECTION BY RADIOACTIVE METHOD)

By D. Shakhnazarov

Petroleos y Minas, Buenos Aires, vol. 11, No. 128, 1931, pp. 7-9.

In the beginning of this article the author mentions briefly the principles
f radioactive exploration, the approximate amount of radium extracted so far
n various regions of the earth, and the price of it. The methods of radio-
ctive exploration for minerals are described in the second part of the article.

In conclusion Shakhnazarov mentions the electroscopic method established
y Pierre Curie and the apparatus constructed, by the application of which
ood results may be obtained in geophysical prospecting.--W. Ayvazoglou.

(728) ON THE DEPOSITS OF THE RADIOACTIVE MINERAL FORMATIONS IN THE DISTRICT OF KHAKASSK (FORMERLY PROVINCE OF ENISSEIYSK) (IN RUSSIAN)

By G. Labasine

Transactions of the Geological and Prospecting Service of the U.S.S.R.,
Leningrad, No. 19, 1930, 56 pp.

By prospecting work the author established radioactive substances in the
ollowing three formations in the Khakassk region: (1) In the pegmatites and
plites of the deep rocks; (2) in the secondary, mainly colloidal, minerals,
nd (3) in rocks containing rich carboniferous residues.

In the samples taken from the region of the Boulan-Koul Lake, the Tyrdov
assif, the cupriferous sandstones of Tchagys-Karyum, the carboniferous rocks
f the Askyz-Abakane basin and the colloids of the Kluichevaya mountain the
atio of U to Th varied between 4.4 and 43.9. Especially marked prevalence of
horium was established in the pegmatites of the Tyrdanov massif (Th : U = 42.7)
nd in the colloids of the Kliuchevaya mountain (Th : U = 43.9).

The region is considered to be of great scientific interest.--W. Ayvazoglou.

(729) RADIOACTIVITY AND THEORIZING

By Bailey Willis

American Journal of Science, New Haven, vol. 23, No. 135, 1932, pp. 193-226.

Since 1915 several geologists and geophysicists have framed hypotheses regarding the distribution of radioactive minerals in the earth and the heat effects attributed to them. Holmes, Joly, Chamberlin, Barrel, and L. H. Adams have published more or less elaborate discussions.

In this article the several hypotheses are considered from the point of view of the method of multiple hypotheses, each of them being briefed and subjected to the test of the verity of its fundamental assumptions. The task is simplified by grouping the theories under two heads, namely those that postulat some regular distribution of radioactive minerals in the globe versus those tha assume irregularity of distribution. Reasons are assigned for regarding the former as inconsistent with the facts and consequently unreal, whereas the latter group of discussions appears to contain the seed of fruitful progress toward an understanding of the thermal, eruptive history of the earth.--Author's abstract.

7. UNCLASSIFIED METHODS

(730) TRABAJOS DEL LABORATORIO GEOFISICO

(WORK CARRIED OUT IN THE GEOPHYSICAL LABORATORY)

By D. Shakhnazarov

Petroleos y Minas, Buenos Aires, vol. 11, No. 124, 1931, pp. 4-8.

The purpose of this article consists in giving a summarized description of methods of geophysical prospection. The following items are discussed:

1. Prospecting for minerals by the magnetic method; historical review.
2. Principles of magnetometric exploration for minerals.
3. Determination of magnetic properties of minerals and rocks.
4. Determination of gravity of minerals and rocks.
5. Determination of radioactivity of minerals and rocks.
6. Collection of samples.

Maps showing geophysical properties of minerals as established from the data obtained in geophysical laboratories will be of great use in geophysical prospecting.--W. Ayvazoglou.

(731) ESTUDIOS GEOFISICOS. UN FACTOR DE ACTUALIDAD EN EL DESARROLLO DE LA MINIERA

(GEOPHYSICAL STUDIES. A FACTOR OF PRESENT IMPORTANCE IN THE DEVELOPMENT OF MINING)

By D. Shakhnasarov

Petroleos y Minas, Buenos Aires, vol. 11, No. 126, 1931, pp. 5-9.

The importance of geophysical prospection (magnetic, gravimetric, radio-
tive, electrical and seismic methods) is emphasized. A brief description
the development of geophysics in various countries (Germany, United States,
ain, France, Hungary, Mexico, Russia, and Yugoslavia) is given. The costs
geophysical exploration by different methods are discussed.--W. Ayvazoglou.

(732) BRIEF SUMMARY OF THE WORK CARRIED OUT IN 1930 IN THE SCIENTIFIC RESEARCH DEPARTMENT OF THE GEOLOGICAL AND PROSPECTING SERVICE OF THE GEOPHYSICAL INSTITUTE (IN RUSSIAN)

By V. Andreev and V. Chernobrovin

Vestnik of the Geological and Prospecting Service in the U.S.S.R.,
Leningrad, vol. 6, No. 1-2, 1931, pp. 43-47.

The Geophysical Institute carried on investigations along the following
x branches:

1. Electrical. Development of electrical methods of prospecting, improvement in construction of apparatus, training of personnel.
2. Magnetic. Comparative measurements for the determination of the accuracy of the field instruments. The system of suspension of the magnets of the coil of a deflector-magnetometer was improved by applying bifilar suspension.
3. Gravitational. Magnetic properties of materials used for manufacturing variometer beams were investigated; beams and threads manufactured in Russia were tested; Vening-Meinesz' pendulum apparatus was investigated; the temperature of the constants of Stückrat's pendulum apparatus was investigated.
4. Seismic. The theory of the seismic method of prospecting was developed.
5. Radioactive. Laboratory tests on various branches of the radioactive method of prospecting were carried on. The radioactivity of samples of more than 5,000 boxes of geological collections was investigated.
6. Geothermal and stratigraphic. Apparatus used for geothermal investigations was tested; a new electrical thermometer for depths to 750 meters was constructed. A new apparatus for measuring crooked boreholes was prepared.

Field operations were carried out on a larger scale; the number of field
rties increased from 43 in the previous year to 80; the area surveyed in-
eased from 2,757 km.^{2} to 7,995 km.^{2}--W. Ayvazoglou.

(733) GEOPHYSICAL SOCIETY MEETS AT NEW ORLEANS

Editorial note

The Oil and Gas Journal, Tulsa, vol. 30, No. 33, 1932, p. 111.

The meeting of the Society of Petroleum Geophysicists, held at New Orlean was opened on December 30, 1931. The following 13 technical papers have been scheduled for the program:

(1) Eötvös torsion balance, by Donald C. Barton; (2) A new instrument for measuring very small differences in gravity, by Kenneth Hartley; (3) Charts fo torsion balance readings, by M. M. Slotnick; (4) The calculation of the motion of the ground for seismograph records, by H. A. Wilson; (5) Amplitude relation in seismic prospecting, by W. Maurice Ewing; (6) Asymetry of sound velocity in stratified geologic formations, by Burton McCollum and F. A. Snell; (7) Veloci of elastic waves in granite, by L. Don Leet and W. Maurice Ewing; (8) The reflection seismograph -- an application, by Eugene McDermott; (9) Seismological discovery and partial detail of the Vermillion Bay Salt Dome, by E. E. Rosaire and O. C. Lester, jr.; (10) Some special cases of the reflection and refractio of seismic waves between similar rocks with application to the study of crusta layers by distant quakes, by Louis B. Slichter and V. Gabrilovich Gabriel; (11 The correlation of isogeothermal surfaces with the rock strata, by C. E. Van Orstrand; (12) Geothermal gradient determinations in the Lake Superior copper mines, by L. R. Ingersoll; (13) Electrical prospecting as applied in locating oil structures, by Leo J. Peters and John Bardeen.--W. Ayvazoglou.

8. GEOLOGY

(734) ASYMMETRIC FOLDS WITH REFERENCE TO GERMAN SALT BODIES

By Hans Stille

Bulletin of the American Association of Petroleum Geologists,
Houston, vol. 16, No. 2, 1932, pp. 169-177.

A brief discussion is presented of the conditions of asymmetry and overhang in the salt domes of Germany, Reference is made to the folded region of Central Spain, and the orogeny here is likened to that in Germany. This paper is offered to facilitate the comparison between German and American salt-dome phenomena.--Author's abstract.

9. NEW BOOKS

35) Freeman, John Ripley. Earthquake damage and earthquake insurance. McGraw-Hill Book Co. (Inc.), New York and London, 1932, 904 pp. Price, $7. The book contains studies of a rational basis for earthquake insurance and of engineering data for earthquake-resisting construction. Table of contents: (1) The present situation and the scope of the present study; (2) Earthquake motion and causes of earthquakes; (3) The ordinary measure of earthquake violence; (4) Frequency and violence of earthquakes in various parts of the United States and Canada; (5) The narrow zone of destruction by earthquakes; (6) Structural lessons and loss ratios from the San Francisco and Charleston earthquakes; (7) Relation of structural safety to the local stability of the ground; (8) Structural lessons and loss ratios from other important American earthquakes; (9) Lessons about earthquake-resisting buildings from the Japanese earthquake of 1923; (10) Lessons from Italian earthquakes; (11) Other interesting earthquake lessons from Nicaragua and New Zealand; (12) Prediction of time, place of occurrence and damage of future earthquakes; (13) Some tentative figures on probable average earthquake loss ratio for various localities and various types of buildings; (14) Recent rates of premium for earthquake insurance by stock insurance companies; (15) Affiliation of earthquake insurance with fire insurance; (16) Municipal building codes for protection against earthquake damage; (17) Textbooks on earthquake-resisting structural design; (18) Researches with shaking tables; (19) The motion of the ground in an earthquake; (20) The design of earthquake-resisting buildings; (21) Data from seismograms, etc.; (22) Suggestions for a program of earthquake research.--W. Ayvazoglou.

36) Haddock, M. H. Deep borehole surveys and problems. McGraw-Hill Book Co. (Inc.), New York, N.Y., 1932, 296 pp., 186 figs., $4. The important and accepted means of surveying the courses of deep boreholes and orientating their cores are explained. The book traces the evolution of modern borehole-surveying devices, and adds various problems relevant to strata, location, and orientation. Chapter headings: (1) Deviation and its causes; (2) Auxiliary registrations in borehole surveys; (3) Instrumental survey of boreholes; (4) Fluid methods of surveying boreholes; (5) Core orientation; (6) Compass and plumb-bob methods; (7) Pendulum methods; (8) Photographic methods; (9) Gyroscopic compass methods of surveying boreholes; (10) Geophysical methods of investigating boreholes; (11) Problems; (12) Bibliography.--W. Ayvazoglou.

37) Lahee, Frederick H. Field geology. McGraw-Hill Book Co. (Inc.), New York and London, 3d ed., 1932, 789 pp., 538 figs., $5. Pocket size, flexible. This book is intended to serve as both textbook and pocket manual on those phases of geology involved in field work. The book contains a chapter dealing with geophysical surveying, including the torsion balance, magnetic, seismic, and electrical methods.--W. Ayvazoglou.

10. PATENTS

(738) ELECTROMAGNETIC WAVE EXPLORER

Ralph W. Deardorff, of Contra Costa County, California

U. S. Patent 1,838,371. Patent issued December 29, 1931.

This invention relates to the locating of mineral deposits, such as oil or ores, by the aid of directional transmission and detection of electromagnetic radiations.

The objects of the invention are: To make it possible to determine the character of the deposits by causing them to act as reflectors of electromagnetic radiant energy, and by ascertaining the quality of the reflection as a function of the frequency used for the radiations; and to make it possible to investigate the character of the invisible deposits by determining the spee at which the radiations pass through the medium formed by the deposits.

Claims allowed - 3.

(739) ELECTRICAL PROSPECTING

Charles R. Nichols and Samuel H. Williston, of Dallas, Texas

U. S. Patent 1,841,376. Patent issued January 19, 1932.

The present invention is characterized by the creation of such an electric current flow through the earth as to impress an identifiable potentia condition or characteristic on a portion of the earth's surface, and by the determination of the direction and extent of the displacement, if any, of such portion from a geographical location which is fixed by the arrangements creating such current flow, and with which said surface portion will or will not coincide, accordingly as the distribution of the current flow through the eart adjacent to said location is not or is significantly affected by an earth body or bodies of different conductivity from the adjacent earth.

Claims allowed - 23.

(740) ELECTRICAL PROSPECTING

Charles R. Nichols and Samuel H. Williston, of Dallas, Texas.

U. S. Patent 1,841,975. Patent issued January 19, 1932.

The present invention is characterized by the provisions made for the effective use of the portion of the energizing circuit or circuit system whic is external to the earth itself, to establish a definite or base potential at a point in the said circuit system which may be utilized in determining the potential at the exploration point, or in making measurements dependent on th difference between the said base potential and the exploring electrode potent

The present invention is especially characterized by the manner in which he base potential point in the energizing circuit is established, and in articular by the steps taken to compensate for the variable and ordinarily known, contact resistance between the earth and the external energization ircuit at each point of energization.

Claims allowed - 8.

(741) ELECTRICAL PROSPECTING

Charles Rodney Nichols and Samuel H. Williston, of Dallas, Texas.

. S. Patent 1,841,976. Patent issued January 19, 1932.

The present invention relates to methods of and apparatus for determining he location and character of subsurface bodies of earth portions differing in lectrical resistance from adjacent earth portions by creating potential ifferences between separated portions of the earth surface to induce current lows through the earth underlying the exploration field.

The invention provides a method and apparatus adapted to rapid re-onnaissance work along a line extending across the field to be explored, as ell as means for making effective use of the circuit system to establish a ase potential which may be utilized in determining the potential at an explo-ation point.

Claims allowed - 6.

(742) ELECTRICAL PROSPECTING

Ralph M. Nichols, of Dallas, Texas, assignor of one-half to Charles R.
Nichols and one-half to Samuel H. Williston, both of Dallas, Texas.

. S. Patent 1,841,977. Patent issued January 19, 1932.

The general object of the present invention is to provide an improvement, haracterized by the simplicity of apparatus and operations required, in the ethod of determining the location and character of subsurface bodies or arth portions of different electrical resistance from the adjacent earth por-ions, by creating an electric current flow through the earth and measuring lectrical effects produced at the surface of the earth resulting from such urrent flow.

Claims allowed - 3.

(743) ELECTRICAL PROSPECTING

Charles R. Nichols, of New York, N. Y., and Samuel H. Williston,
of New Haven, Connecticut.

U. S. Patent 1,842,361. Patent issued January 19, 1932.

The general object of this invention is to provide improved methods for detecting the location and character of subsurface bodies or earth portions of different electrical resistance from the adjacent earth portions.

The method consists in energizing distributed points in a field of observation by means of a source of alternating current so as to create isopotentia lines which intersect at a point, and in locating the said point by means of a detector circuit including an antenna movable over the exploration field.

Claims allowed - 1.

(744) ELECTRICAL PROSPECTING

Charles R. Nichols and Samuel H. Williston, of Dallas, Texas.

U. S. Patent 1,842,362. Patent issued January 19, 1932.

The method described in the present invention consists in energizing an observation field by causing an electric current flow through the earth betwee points thereof on which different potentials are impressed, as by means of electrodes inserted in the earth and connected to the terminals of an electric generator or generators, in order that the resultant current flow distributio through the earth may be determined, or compared with the current distribution which would result from such energization if the earth beneath the observation field were of uniform conductivity.

Claims allowed - 11.

(745) SEISMOGRAPH

Sepp Horvath, of Houston, Texas.

U. S. Patent 1,842,968. Patent issued January 26, 1932.

This investigation relates to an improvement in seismographs and recordin mechanisms employed in locating geological structures. The invention involves the use of instruments embodying the electrical transfer of mechanical vibrations of the ground into corresponding electrical alterations of conditions of electrical circuits. With electrical circuits of the type here used very sensitive measurements of these mechanical vibrations can be had by means of high-frequency circuits.

Claims allowed - 9.

(746) TORSION BALANCE AND THE LIKE

Herman Shaw, of London, and Ernest Lancaster Jones, of Berkshire,
England, assignors to Geophysical Research Corporation, of
New York, N. Y., a corporation of New Jersey.

S. Patent 1,843,342. Patent issued February 2, 1932.

This invention relates more particularly to improvements in the design and rangement of torsion balances of the type in which one portion of the sus- nded system is maintained at a definite vertical distance above or below her portions of that system, as, for example, in balances of the Eötvös and milar types.

It further relates to improved arrangements in the distribution of the sential parts of any such suspended system, and to the improved arrangement d simultaneous operation of one or more such systems forming a complete in- rument. The object of the invention is to provide means for obtaining fewer ttings of the instrument than has hitherto been possible.

Claims allowed - 7.

(747) DETERMINATION OF SUBSURFACE FORMATIONS

John Clarence Karcher, of Montclair, N. J., assignor to Geophysical
Research Corporation of New York, N. Y., a corporation of New Jersey.

S. Patent 1,843,725. Patent issued February 2, 1932.

This invention relates to methods of and apparatus for determining the cation and depth of geological formations and particularly to the determining geological folding in these subsurface formations. In the present method use made of waves which are transmitted downward into the earth more nearly rtically than heretofore and are directly reflected from the subsurface layer question to the earth's surface to a point which is usually a distance away om the source that is substantially less than the depth of the subsurface rmation.

Claims allowed - 11.

(748) METHOD OF AND APPARATUS FOR DETECTING THE PRESENCE OF PROFITABLE DEPOSITS IN THE EARTH

Günther Laubmeyer, of Kassel-Wilhelmshohe, Germany.

S. Patent 1,843,878. Patent issued February 2, 1932.

The method according to this invention consists of collecting underground r by means of a special apparatus and testing it quantitatively for the istence of certain gaseous substances which are in direct relation with the deposits. The apparatus is in the form of a closure or lid for borings, the lid having besides an outlet pipe at least one bell-shaped cylinder or the like surrounding the outlet pipe; the diameter of this cylinder is larger than that of the borehole. The construction may contain two cylinders arranged concentrically to the other.

Claims allowed - 8.

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Senior physicist, U. S. Bureau of Mines.

1. GRAVITATIONAL METHODS

(749) LA PROSPECTION GRAVIMÉTRIQUE DU SOUS-SOL

(GRAVIMETRICAL PROSPECTING OF THE SUBSOIL)

By M. H. Galburn

Annales des Mines, Paris, vol. 20, No. 11, 1931, pp. 355-424.

In the first part of this article the author gives a mathematical derivation of formulas concerning gravity and the torsion balance, gradient of gravity, and the direction of the intensity of gravity at a point near the surface of the earth. Principles of gravimetrical prospecting, including correction for topography, are discussed.

The second part deals with the examination of the results of torsion balance measurements obtained at two stations (region of Gabian and Liege). Two maps showing the vector gradients and the isogams are added. Their interpretation forms the last part of the article.--W. Ayvazoglou.

(750) L'ANTICLINALE GRAVIMETRICO-PETROLIFERA DI FONTEVIVO

(GRAVIMETRICAL PETROLIFEROUS ANTICLINE AT FONTEVIVO)

By A. Belluigi

Extract from the Bolletin del Comitato Nazionale, Italiano per la Geodesia e la Geofisica. Second series, vol. 2, No. 2, Feb., 1932, pp. 1-3.

The note concerns gravimetrical exploration of the anticline in the region of Fontevivo, known for its petroliferous structure. Results of the investigation, accompanied by two maps, are given.--W. Ayvazoglou.

(751) THEORETICAL BASIS OF ISOSTASY

By W. D. Lambert

American Journal of Science, New Haven, vol. 21, No. 123, 1931, pp. 345-349.

The validity of observational proof of isostasy has been questioned on theoretical grounds by Hopfner, but his presentation of the mathematical theory is not generally accepted by geodesists. The author quotes Prey's views in support of the idea that the earth is isostatic. The Bruns term, the reduction from the geoid to the spheroid of reference of the gravity formula, can also be applied only qualitatively to explain an observed gravity anomaly. Criticism is also made of Hopfner's identification of the Bruns term with Bowie's reduction, but Heiskanan shows that the concepts are different.--R. S. Read. Abstract reprinted from Science Abstracts, vol. 34, No. 404, Aug., 1931, p. 665.

2. MAGNETIC METHODS

(752) TEST-DEFLECTIONS FOR VARIOMETERS AND MAGNETOGRAPHS

By George Hartnell

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No.4,
1931, pp. 279-296

This paper develops equations describing the deflections of a suspended gnet produced by a deflecting-magnet fixed in any desired position. The stances are assumed to be large enough to render distribution effects gligible. The equations are applied individually to a declination (D), rizontal intensity (H), and vertical intensity (Z) variometer, and to an sembly of these three variometers, which constitute a magnetograph. Under e conditions assumed, the equations furnish a convenient means of testing gnetic instruments. Since such instruments contain one or more magnets as sential parts, their response to magnetic forces as theoretically deduced ovides a criterion of their merit.—Author's abstract.

(753) MAGNETIC SECULAR VARIATION FOR EPOCH 1930

By C. C. Ennis

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36,
No. 4, 1931, pp. 315-317.

This paper is a contribution in the field of magnetical investigation to Bartels' article "Geophysical stereograms" published in vol. 36, No. 3, 31, of Terrestrial Magnetism (Geophys. Abs. 33, p. 334). Ennis makes ailable the data employed in the construction of stereogram 8 which shows e secular variation of the magnetic field-vector at the intersections of the ridians 0°, 20°, 40°, etc., with the circles of latitude 60°N., 40°N., - - - °S.

As the resulting salient features of the secular variation were pointed t by Bartels, the author gives here only the data upon which the stereogram pends. They are shown in a table.--W. Ayvazoglou.

(754) LES ÉLÉMENTS DU MAGNÉTISME TERRESTRE À JASSY EN 1931

(THE ELEMENTS OF THE TERRESTRIAL MAGNETISM AT JASSY IN 1931)

By St. Procopiu

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36,
No. 4, 1931, pp. 341-343.

In this article the author gives the results of measurements of magnetic ements carried out by him, together with Gh. Vasiliu, in 1931 near Jassy oumania), where a magnetic anomaly was established, and compares his data th those obtained by Hepites and Murat in 1893.--W. Ayvazoglou.

(755) PRELIMINARY REPORT OF THE MAGNETIC OBSERVATIONS MADE DURING THE AEROARCTIC EXPEDITION OF THE GRAF ZEPPELIN, 1931.

By Gustaf S. Ljungdahl

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No. 4, 1931, pp. 349-355.

The magnetic work during the arctic expedition of the airship Graf Zeppelin in July, 1931, was undertaken for the purpose of studying the possibilities of making magnetic measurements under the conditions involved and of obtaining as valuable observations as possible. A preliminary report of the results is presented in this article.

The determinations of the horizontal intensity (H) were made with the double compass. This investigation was subsidized by the Carnegie Institution of Washington. The results are given in a table.

An attempt was made to determine the declination (D) with a Thomson compass rose with fibre suspension, fashioned according to a model of Dr. Haussmann, by projection of the sun's shadow on the card. Only a few determinations were made, owing to the difficulties of taking the sun's bearing from the compass position.

The undamped compass rose often was subject to great and irregular oscillations and vibrations. Accordingly the results are not considered to be very exact.

For measurements of the vertical intensity (Z) Schmidt's field balance was mounted in gimbals and taken on board. The sensitivity was diminished from 30 γ to about 200 γ per scale division. No measurements could be obtained, owing to slipping of the magnet system caused by vibrations of the airship.--W. Ayvazoglou.

(756) GEOLOGISTS HEAR TALK ON GEOPHYSICAL METHODS

Editorial note

The Oil and Gas Journal, Tulsa, vol. 30, No. 37, 1932, p. 121.

In a lecture before the Shreveport Geological Society on January 21, 1932, W. M. Barret outlined the principles of the magnetic method of prospecting. Measuring instruments used in the field and laboratory apparatus developed for improving the technique of interpreting the field data in terms of geologic structure were discussed.--W. Ayvazoglou.

(757) ZU FOLGHERAITERS BESTIMMUNGEN DES MAGNETISCHEN ERDFELDES AUS DER MAGNETISIERUNG GEBRANNTER TONGEGENSTÄNDE

(CONCERNING FOLGHERAITER'S DETERMINATIONS OF THE MAGNETIC EARTH FIELD FROM THE MAGNETIZATION OF BAKED EARTHEN-WARE)

By. J. Koenigsberger

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 1, 1932, pp. 51-54.

About 35 years ago Folgheraiter determined the magnetic inclination i t the Roman and Etrurian epochs by measuring the direction of the remanent gnetization in vases, assuming that they were baked standing on their ses. Folgheraiter found i to be about the same as at the present time 57°) in the year 100 after Christ and from +2° to +25° in the years 700 and 00 B.C.

Examination of the following questions was made by Koenigsberger to prove olgheraiter's conclusions:

1. Is it possible to calculate exactly the inclination by measuring the three perpendicular components of the remanent magnetization?
2. Is the direction of the inclination influenced by quick changes of the temperature?
3. Does the additional burning of black color (as is used on antique vases) cause any change?
4. How great is the quotient $J_r : K \cdot T$ for similar materials, T being the present-time total intensity and K the susceptibility?

The experiments have shown that:

1. The accuracy was about ± 1°.
2. The remanent inclination was not changed by the temperature differences while baking.
3. The additional burning must be made at about 300° in order that no changes of the previous remananent magnetization could be caused.
4. Values similar to those of the most eruptive rocks were found.

The small values of inclination obtained by Folgherait for the Etrurian poch can probably be explained by the supposition that the Etrurians baked he vases by putting them in horizontal position, or that they rebaked them in orizontal position while fastening the handles.—W. Ayvazoglou.

(738) INVERSION DE L'INCLINAISON MAGNÉTIQUE AUX ÂGES GÉOLOGIQUES. NOUVELLES OBSERVATIONS

(INVERSION OF MAGNETIC INCLINATION THROUGH GEOLOGICAL AGES. NEW OBSERVATIONS)

by P. L. Mercanton

Comptes Rendus, Académie des Sciences a Paris, vol. 192, No. 16,
1931, pp. 978-980.

In this article the author discusses facts collected from the study of the remanent magnetism of various samples of volcanic lava from both hemispheres (Greenland, Spitzbergen, Australia), indicating that at Tertiary epochs, at the time of large volcanic eruptions, the terrestrial magnetic inclination was opposite to that existing now. Magnetic inclinations of a series of samples are given.--W. Ayvazoglou.

(739) MAGNETISMUS RIPU (IN BOHEMIAN) (MAGNETISM NEAR RIP)

by V. Spacek and B. Zahálka

Rozpravy 11, Tridy Ceske Akademie, Prague, vol. 39, No. 48, 1930,
pp. 1-13.

Theoretic and practical remarks on the sensitivity of Schmidt's variometer are given in the introduction to the article.

Results of the measurements of the differences

$$\Delta V = V - V_0$$

in which V is the vertical component of the terrestrial magnetism near Rip are given. The results are shown in a map.

The article is concluded by a supplement written by B. Zahálka in which the results of geophysical measurements carried out by Spacek are compared with the geological survey carried out by Zahálka.

According to the results it was established that there were two systems of faults in the tectonic of the surroundings of Rip, one W. NW. - E. SE. and the other S. SW. - N. NE. Rip is situated at the point of intersection of the two most important faults. These faults are characterized not only by magnetic anomalies but also by geological structure; thus there is no doubt about their existence. The results proved also the hypothesis established on this subject by Professor Laska. This hypothesis was the main reason for carrying out the measurements.--Authors' abstract translated by W. Ayvazoglou.

(760) STANOVENI AZIMUTU PRI PRESNEM MERENI MAGNETICKE DEKLINACE (IN BOHEMIAN)

(DETERMINATION OF THE AZIMUTH IN THE ACCURATE MEASUREMENT OF MAGNETIC DECLINATION)

By V. Spacek

Special reprint from the Zememericsky Vestnik, No. 7, 1930.

In measuring declinations the astronomic determination of the geographical ridian usually takes much time. In this article the author shows that on a all area it is sufficient, in carrying out the measurements, to determine e direction of the meridian at one place only.

At the other places the measurement is made by angles only, as in thenot and Hansen problems.

By the method described the effect of the various geological formations the magnetic inclination can be determined over a small area at as many ces as at which can be measured the vertical component by Schmidt's varioter during one day—Author's abstract translated by N. Ayvazoglou.

3. SEISMOLOGICAL METHODS

(761) TRAVEL-TIME CURVES AT SMALL DISTANCES AND WAVE VELOCITIES IN SOUTHERN CALIFORNIA

By B. Gutenberg

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 1,
1932, pp. 6-45.

The study of local shocks in California may now be made with considerable curacy in many cases, owing to the system of seismological stations in this ntry.

Gutenberg's studies of travel-time curves at small distances and wave locities in southern California are described in this article under the llowing headings:

1. The seismological stations. A list of stations with data concerning m is given in Table 1. The location of most stations is shown in a figure.

2. The shocks. Only those shocks were used whose epicenters seemed to be rtain within a very few kilometers. Data on the shocks used for the investitions are shown in Table 2. Table 3 shows calculation of epicenters and

origin times, and Table 4 contains an enumeration of seismograms for investigation of travel times.

3. The $\overline{P}$ waves. By using the epicenters given in Table 2 and the corresponding distances for every shock, the apparent velocity of the $\overline{P}$ waves was calculated. Table 5 shows the result. Table 6 gives the observed travel time of the $\overline{P}$ waves minus distance divided by 5.55. The principal result of Table 6 is that at distances between 44 and 86 kilometers the waves generally arrived 0.3 second earlier than would correspond to an apparent velocity of 5.55 kilometers per second. Between 100 and 200 kilometers this difference decreased to a mean of 0.1 second; in the interval which followed the difference was practically zero; at distances of over 400 kilometers the difference was nearly always negative, and the mean passed below -1.0 second between 500 and 600 kilometers. The most probable values of the travel times of $\overline{P}$ in southern California are given in Table 7.

4. P_n and P_x. The travel times (calculated from the observed times of arrival of P_n and the origin times as given in Table 2) are shown in Table 8. Travel times of P_n and difference in the travel times of $\overline{P}$ and P_n according to various investigations are shown in Table 9. In Table 10 the observed time of the P_x wave and the observed time differences $P_x - P_n$ are given. Table 11 shows the mean travel times of the P_x wave in California, the mean differences $P_x - P_n$ and the corresponding values found by Conrad with respect to the Schwadorf (Austria) shock.

5. Other waves between P_n and $\overline{P}$. Between P_n and $\overline{P}$ there are some other well-marked phases. They can be divided into two classes: Waves of the first class are well marked at short distances. The second class of waves between P_n and $\overline{P}$ is noticed especially at greater distances. In the seismograms of th California shocks two kinds of waves of the first class could be found -- P_m and P_y -- and three kinds of the second class -- a, b, and c. The time differences of all these waves compared with P_n are plotted in a figure.

6. S waves and surface waves. Observed travel times and mean travel tim of S waves and surface waves are given in tables.

7. Other waves. It is known that if a longitudinal or a transversal wav touches a surface between two different layers, it divides into four waves. Since there are several surfaces of this kind within the upper 40 kilometers o the earth's shell, a large number of reflected and refracted waves must be expected. Probable travel time curves of such waves at various distances are given in figures.

8. The depth of foci. From the results of the investigation the author derived that very probably all shocks originated at a depth between 10 and 15 kilometers.

9. The thickness of layers in southern California. Assuming the depth
a focus at 12 kilometers, the thickness of the first (granitic) layer is
lculated to be 14 kilometers. This thickness of 14 kilometers agrees very
ll with the value of 15 kilometers found by Byerley (Bulletin of the National
search Council, No. 61, p. 38, Washington, July, 1927), Wood and Richter
ulletin of the Seismological Society of America, vol. 21, p. 28, 1931) from
asts.

References complete the article.--W. Ayvazoglou.

(762) MIT WELCHER GENAUIGKEIT LÄSST SICH DIE SCHALLGESCHWINDIGKEIT IN DER STRATOSPHÄRE FINDEN?

(AT WHAT ACCURACY CAN THE VELOCITY OF SOUND IN THE STRATOSPHERE BE DETERMINED?)

By B. Gutenberg

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 1, 1932,
pp. 46-50.

In a recent paper (Velocity of Sound and the Temperature in the Strato-
here; Geophys. Abs. 21, p. 22), Gutenberg tried to show that in general the
ight at which the temperature of the stratosphere begins to increase more
pidly is greater in summer than in winter. There are very many effects due to
avoidable errors, especially the effect of the wind at heights
bove 10 kilometers, in general unknown. A simple method has been used by
tenberg to calculate the results within the limits caused by the errors. Some
jections to this method were raised by F. J. W. Whipple in his article entitled
Methods of Estimating the Heights Reached by the Air-Waves Which Descend in
nes of Abnormal Audibility, published in Gerlands Beiträge, Vol. 31, No. 1-3,
31, pp. 158-163.

In this article Gutenberg examines the objections raised by Whipple.--A.
vazoglou.

(763) ON THE RAYLEIGH WAVE PROPAGATING OVER THE SURFACE OF A HETEROGENEOUS MATERIAL

By H. Honda

Geophysical Magazine, Tokyo, vol. 4, No. 2, 1931, pp. 137-145.

The problem of the surface wave of Rayleigh's type propagating along the
rface of a heterogeneous material, of which Lame's constants λ and μ increase

linearly with increasing depth and the density remains constant throughout the material, was solved approximately under some assumptions. And the expressions showing the velocity, the dispersion of the wave propagation, and the displacement components of the particles of the material and so on were obtained.--Author's abstract.

(764) REPORT ON THE ACTIVITY OF THE EARTHQUAKE RESEARCH INSTITUTE, TOKYO IMPERIAL UNIVERSITY, DURING THE SECOND HALF OF 1930

By Chuji Tsuboi

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 1, 1932, pp. 113-122.

This is the fourth report in which Tsuboi summarizes the results of an investigation carried out by the Earthquake Research Institute during the secon half of 1930 (for previous reports see Geophys. Abs. 10, 16, and 24).

The items of this report are as follows:

1. Seismic activities in Idu Peninsula. An outline of the scheme of investigations carried out by the members of the institute is given. The results will be published in due course.

2. Instrumental. M. Ishimoto elaborated an accelerometer for the purpos of observing earthquake accelerations. With this instrument it is possible to obtain records of earthquake accelerations on smoked paper solely by mechanica means. The proper oscillation period of the pendulum of the accelerometer is 0.15 second and the statical magnification 200.

3. (1) Terada has calculated the heat generated in a deformation of the earth's crust. (2) Terada, Miyabe, and Tsuboi have calculated the areal expansions and contractions of various earthquakes and volcanic districts by using as data relative displacements of triangulation points.

4. Statistical. (1) Yamaguchi studied the aftershocks of the Kwanto earthquake of 1923, of the Tango earthquake of 1927, the Tazima earthquake of 1925, and of the Oomachi earthquake of 1918 with respect to tidal heights in th seas nearest to the respective seismic region. (2) Takayama and Suzuki made a statistical study of the relation between sunspot activity and the occurrenc of destructive earthquakes in Japan.

5. Mathematical. Sezawa and Nishimura discussed mathematically the deformation of a single shock with its propagation through an elastic medium for two cases; one was related to the propagation of a shock through a medium composed of different parts of different elastic constants and densities, with

eir boundaries parallel to the wave front, while the other was related to e propagation of a shock through a medium which is horizontal and disrsive in itself.--W. Ayvazoglou.

4. ELECTRICAL METHODS

(765) PROGRESS AND PROBLEMS OF ELECTRICAL PROSPECTING (IN RUSSIAN)

By Parfenov, Melikian and Nikitin

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 12, No. 1, 1932,
pp. 7-14.

Schlumberger's method for studying the formations penetrated by drill les, "electrical coring," and its application in the oil region of Azneft in e U. S. S. R. are discussed. The development of this method during the year 30-1931 is illustrated by a figure. A series of diagrams showing the results investigations of drill holes by the electrical coring method is given.

The authors conclude that this method is of great importance in geological terpretation of the subsoil and should be used on a large scale.--W. Ayvazoglou.

(766) GOLD DEPOSITS OF NORTH SWEDEN

Editorial note

The Mining Journal, London, vol. 176, No. 5055, 1932, pp. 124-125.

The important possibilities of the Boliden district in north Sweden, the in deposit of which was discovered in 1924 by electrical methods of prospectg, are described. Of the many indications obtained by the geophysical thod, only comparatively few of the more promising indications were tested by e drilling.--W. Ayvazoglou.

(767) DER EINFLUSS DER ANISOTROPIE DER GESTEINSMEDIEN AUF DIE VERTEILUNG NIEDERPERIODISCHER, ELEKTROMAGNETISCHER WECHSELFELDER

(INFLUENCE OF THE ANISOTROPY OF THE EARTH'S ROCK MEDIA ON THE DISTRIBUTION OF LOW-PERIOD ELECTROMAGNETIC ALTERNATING FIELDS

By Max Müller

Gerlands Beiträge zur Geophysik, Leipzig, vol. 30, No. 1/2, 1931,
pp. 142-195.

Contents of the paper: (1) Introduction and the objects of the research.) Apparatus for the production and measurement of small period electromagnetic ternating fields of any low frequency. (3) Calculation of the current field an electric dipole in connection with frequency, conductivity, and thickness strata. Setting forth of the conditions for the disappearance of the source-free secondary current. (4) The influence of the anisotropy of the rock media on the distribution of stationary currents. (5) Graphic calculation of the magnetic field of a double source with consideration of the decrease of the current density with depth. (6) Electromagnetic field measurements by means of a current directly conducted to the earth: (a) Experimental research on the influence of frequency and anisotropy on the distribution of the components of the magnetic field of a double source; exposition of a new method for the determination of the mean conductivity of the earth; (b) investigation of a series of strata by means of low-frequency alternating current; (c) measurement of a deposit of Thuringian magnetite by means of low-frequency alternating current; (d) investigation of a barite-pyrite deposited by means of low-frequency alternating current. (7) Theory of the inductive methods: (a) Calculation of the magnetic field of a stationary circular current; (b) investigation of the dependence of frequency of eddy currents induced in the earth's crust by a closed alternating current; (c) conclusions drawn from the theories of Levi-Civita and Pollaczek. (8) Inductive field measurements by means of alternating currents of various frequency: (a) Investigation of the dependence on frequency of the distribution of the magnetic field of a right-angled cable traversed by an alternating current; discussion of the influence of anisotropy on the Jena shell limestone; (b) investigation of a series of strata by means of low-period electromagnetic alternating fields; (c) investigation of the magnetic external field of a low-period circular current upon anisotropic rock media.

The paper is illustrated by 51 figures including diagrams of apparatus and curves showing the results of observations.--W. Ayvazoglou.

(768) ELECTRICAL CORRELATION OF CROSS-SECTIONS ACCORDING TO INFORMATION OBTAINED FROM LENIN'S REGION (IN RUSSIAN)

By E. Sarkisianz

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 12, No. 1, 1932,
pp. 14-21.

Investigations of drill holes in the Lenin's oil-bearing region by means Schlumberger's "electrical coring" are described. A series of cross sections the holes is given. According to the author, more tests are required to draw definite conclusions on the degree of usefulness with which electrical coring can be applied in the region described.—W. Ayvazoglou.

(769) RESULTS OF THE APPLICATION OF THE "ELECTRICAL CORING" IN STALIN'S REGION (IN RUSSIAN)

By M. Babaian, V. Listengarten, V. Gorin and G. Zaturov

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 12, No. 1,
1932, pp. 21-27.

Electrical coring was applied in Stalin's oil-bearing region for the first me in January, 1931. One hundred and eighty drill holes were investigated ring one year. In this article the authors examine the results obtained from e application of Schlumbergerger's method by comparing the diagrams of the oss sections of a series of drill holes.

Summing up the results of the investigation the authors say that electril coring must be recognized as one of the most useful and necessary methods determining the correlations in the stratigraphical conditions of oil posits.--W. Ayvazoglou.

(770) RESULTS OF THE APPLICATION OF THE ELECTRICAL CORING IN THE ORDJONIKIDZE'S REGION (IN RUSSIAN)

By D. Jabrev and M. Emelianov

Azerbaidjanskoe Neftiance Khoziaystvo, Baku, Vol. 12, No. 1,
1932, pp. 28-30.

Two hundred and twenty drill holes were investigated from October, 1930, to nuary, 1932, by Schlumberger's electrical coring method.

The problem was to prove, based on the results from the interpretation of e data obtained, that stratigraphical conditions of the ground can be deterned in most cases by electrical coring only, and that thus the expensive d slow procedure of mechanical coring can be avoided. On a series of agrams the solution of this problem is examined and the great advantages of ectrical coring are positively established.--W. Ayvazoglou.

(771) THE FIRST PRELIMINARY SUMMARIES OF ELECTRICAL CORING IN KIROV'S REGION (IN RUSSIAN)

By S. Movsesian

Azerbaidjanskoe Neftiance Khoziaystvo, Baku, vol. 12, No.1,
1932, pp. 31-33.

Electrical coring has been used in Kirov's region since November, 1930, as was proved that the correlation of the stratigraphical conditions of the subil could be determined and the oil-bearing and water-bearing horizons tablished by this method. Almost all the holes drilled since March, 1931, re investigated by electrical coring. Whether the mechanical coring can entirely be substituted by this method or not can not, according to the author be definitely decided at present.

A series of diagrams showing the cross sections of the holes and a plan of Kirov's region are added.—W. Ayvazoglou.

5. RADIOACTIVE METHODS

(772) FURTHER EXPERIMENTS ON THE UNIFORMITY OF DISTRIBUTION OF THE COSMIC RADIATION

By Robert A. Millikan

The Physical Review, Minneapolis, vol. 39, No. 3, 1932, pp. 391-39

More careful and prolonged observations on the small, daily variations before reported in the measured intensities of the cosmic rays, the new observations being made under such conditions as to eliminate the possibility of a slight temperature effect suggested by Bowen and Millikan's recent explanation of ionization-pressure relations in high-pressure electroscopes, yield th definite result that "within the limits of the author's present observational uncertainty, which is of the order of a third of a per cent, the sun has no direct influence on cosmic-ray intensities." New evidence is presented that i observed and apparently systematic variations of the order of a third of a per cent are in fact real, they are best interpreted as the result of small change in the blanketing effect of the earth's atmosphere due to air currents.--Autho abstract.

(773) INVESTIGATIONS OF KENNELLY-HEAVISIDE LAYER HEIGHTS FOR FREQUENCIES BETWEEN 1,600 AND 8,650 KILOCYCLES PER SECOND

By T. R. Gilliland, G. W. Kenrick, and K. A. Norton

Bureau of Standards Journal of Research, Washington, D. C., vol. 7, No. 6 1931, pp. 1083-1104

The contents of this paper are as follows:

I. Introduction.
II. 4,045-kilocycle observations.
III. Virtual layer heights as a function of frequency during daytime.
IV. Diurnal variations.
V. Analytical discussion of results: (1) Refraction; (2) reflection phenomena.
VI. Conclusions.

The results of observations of the height of the Kennelly-Heaviside layer carried out near Washington, D. C., during 1930 are presented. Evidence for t istence of two layers (corresponding closely in virtual height to the E and regions discussed by Professor Appleton) is found during daylight on fre-uencies between 3 and 5 megacycles. The modification in the virtual height of e higher F layer produced by the existence of a low E layer is investigated eoretically, and the possibility of large changes in virtual height near the ighest frequency returned by the E layer is pointed out.

A number of oscillograms showing the characteristic types of records bserved during the tests are presented, with a graph of average heights for anuary to October, 1930.--Authors' abstract.

(774) SYSTEMATIC ERRORS IN MEASUREMENTS OF IONIC CONTENT AND THE CONDUCTIVITY OF THE AIR

By O. H. Gish

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 1, 1932, pp. 1-5.

It is pointed out that the possible source of error in ionic content and air-onductivity measurements made with the charging method, which were discussed in ecent papers by Yo Itiwara (Geophys. Abs. 25) and by J. Scholz (Geophys. Abs. 5), were recognized when this method was adopted in the Department of Terrestrial gnetism of the Carnegie Institution of Washington, and that suitable provisions re made to obviate such errors. The design of ion counter which embodies these rovisions is described in detail.

The effect of large ions upon the ionic-content measurements, and of dis-ortions of the earth's field in the region from which air is drawn for both nic-content and air-conductivity measurements, are discussed. It is concluded at these sources of error are negligible for the conditions prevailing on the arnegie" at sea.--Author's abstract.

(775) ACTION OF THE EARTH'S MAGNETIC FIELD ON PENETRATING RADIATION

By B. Rossi

R. Accademia Nazionale dei Lincei, vol. 13, January 4, 1931, pp. 47-52.

Referring to his experiments in which he confirmed Bothe and Kolhörster's sults, which showed that even at sea level there exists a penetrating ultra-diation, the author describes further researches made to test whether the netrating radiation (cosmic radiation) is affected by the magnetic field of the rth. If the penetrating radiation reaches the limit of the atmosphere as a rpuscular radiation having an energy of some thousands of volt-electrons, the rrestrial magnetic field should give place to a strong dissymmetry in its dis-ibution of intensity with respect to the plane of the magnetic meridian. Ex-riments carried out to put in evidence this dissymmetry gave a negative result. J. J. Stewart; Reprinted from Science Abstracts, vol. 34, No. 407, 1931, p.969.

(776) ÜBER EXAKTE INTENSITÄTSMESSUNGEN DER HESSCHEN ULTRASTRAHLUNG

(EXACT MEASUREMENTS OF THE INTENSITY OF HESS' COSMIC RADIATION)

By G. Hoffmann

Zeitschrift für Physik, Berlin, vol. 69, No. 11/12, 1931, pp. 703-718.

For obtaining higher accuracy in measuring the intensity of cosmic radiation according to the ionization method, not only a great amount of gas but also a full compensation of charges is necessary. The results of experiments carried out with the large Twin-apparatus (Zwillingsapparat) are shown by curves. A strong meteorological influence on the soft radiation is apparent. In the case of hard radiation there is noticeable, next to the dependence on pressure of the air, also a direct or indirect influence of the sun. The problem of a proof, free from objection, of the possible existence of a siderea time period seems to be a very difficult one.--Author's abstract translated by W. Ayvazoglou.

(777) ÜBER NEUE ARBEITEN AUF DEM GEBIETE DER KOSMISCHEN ULTRASTRAHLUNG

(CONCERNING NEW WORKS ON COSMIC RADIATION)

By V. F. Hess

Elektrotechnische Zeitschrift, Berlin, vol. 52, No. 29, 1931, pp. 936-937.

The purpose of this article is to inform the readers on several new impor ant works concerning ultra-radiation which appeared since Regener's lecture delivered at the meeting of the Electrotechnical Association and Heinrich-Hertz Society in Berlin (November 18, 1930). This article deals especially with the ionization of the higher layers of the atmosphere and with the latest views of the nature and origin of the cosmic ultra-radiation.--Author's abstract translated by W. Ayvazoglou.

(778) REPARTITION ANGULAIRE DES RAYONS ULTRAPÉNÉTRANTS (RAYONS COSMIQUES)

(ANGULAR DISTRIBUTION OF COSMIC RADIATION)

By D. Skobelzyn

Comptes Rendus de l'Académie des Sciences, Paris, vol. 194, No. 1, 1932, pp. 118-121.

The author shows the distribution of cosmic radiation between the various angular zones as determined from statistical material collected by him.

The results are given in two figures.--W. Ayvazoglou.

(779) SUR LA THÉORIE DE L'AURORE POLAIRE

(ON THE THEORY OF THE AURORA BOREALIS)

By A. Dauvillier

Comptes Rendus de l'Académie des Sciences, Paris, vol. 194, No. 2, 1932, pp. 192-194.

The purpose of this article consists of verifying the theory concerning e aurora borealis, based on new observations made at the Sodankylä magnetic ation (Lapland). The following conclusions drawn by the author are given iefly:

1. The observations confirm entirely the opinion that the aurora repre- nts the secondary effect of the initial cosmic phenomenon which occurred ry far away from the earth.

2. The phenomenon consists of two phases: The first corresponds to the itial cosmic effect and sometimes lasts only a very short time; the second phosphorescence, losing slowly its brightness, due to the excitation, nization, and polymerization (ozone) produced by secondary electrons.

3. The phenomenon presents a simple theoretical aspect only when the tensity remains weak. As soon as it increases the phenomenon becomes more mplicated by secondary effects which are no longer of the cosmic nature.

4. Photometric estimation of the brilliancy of a screen observed in the nith made it possible to calculate the energy spent during an aurora storm admitting the same luminous yield (10^{-2}) as that in the case of a vacuum be.

5. These observations were accompanied by measurements of the gradient the atmospheric potential.

6. The measurement of the intensity of cosmic radiation showed fluctua- ons of 2.5 per cent, or five times greater than the errors of the measure- nt; they could not be attributed to variations of atmospheric pressure or the magnetic activity.--W. Ayvazoglou.

(780) RADIOAKTIVITA DISLOKACI NA PRIBRAMSKU (IN BOHEMIAN)

(RADIOACTIVITY OF THE DISLOCATIONS IN THE DISTRICT OF PRIBRAM)

By Jaroslav Splichal

Rozpravy 11, Tridy České Akademie, Pregue, vol. 40, No. 24, 1930, pp. 1-20.

The district of Pribram offers the occasion for measuring the radio- tivity of soil-air not only in the sediment rocks but also in the granite and in the contact. The radioactivity was evaluated by pumping soil-air out of a bore hole 25 to 35 centimeters deep into the ionization chamber placed on a Wulf's electrometer.

The results of the measurements were as follows:

According to Profile I, shown in the appendix, the activity of soil-air in the granite (490 volts per hour) was much greater than that in the Algondian slates (104 volts per hour).

The radioactivity of the soil-air was the greatest in the granite; average results were 2.2 to 3.6 Mache or 6.10^{-10} grams of the element radium per liter of the soil-air measured.

Algondian schists had an activity of 0.9 Mache or 1.5×10^{-10} grams of the element radium.

The size of the emanation in the Cambrian conglomerates and Cambrian graywackes depended on the amount of detritus of igneous rocks.

The greatest activity was found in the conglomerate of Zitec ($C\alpha_1$) 1.2 Mache or 2.10^{-10} grams of the element radium.

The conglomerate of Hluboš ($C\alpha_2$) and the graywacke of Sadec-Bohutin ($C\alpha_3$) had the values of 0.2 Mache or 0.4×10^{-10} grams of the element radium.

The results of the measurements of radioactivity on the dislocations are graphically reproduced in the profiles. There the distances of the boreholes are plotted as abscissas, the radioactive values of the soil-air in volts per second as ordinates. The following relations are deduced from the radioactive profiles:

1. The fault between the granite and the schist has a fluctuating radioactivity of the soil-air, the value of which is the mean of that of the granite and of the schist.

2. The dislocations in the schists show a maximum activity.

3. The activity on the dislocation in the granite between the two complexes is smaller than in the granite itself.

The measurements of radioactivity on the "clay-split" had also shown that the radioactivity is greater in the dislocation than in the neighborhood.--Author's abstract.

6. GEOTHERMAL METHODS

(781) TEMPERATURE MEASUREMENTS IN THE DEEP CIECHOCINEK WELL (IN POLISH)

By Jan Moniak and Stanislaw Zych

Kosmos, Lwow, vol. 55, No. 1-2, 1930, pp. 423-427.

The results of temperature measurements carried out on July 28, 1929, the deep well Ciechocinek No. 14 are given in the following table:

me during which the thermometers were left in the well		Temperature of the out-side air, °Cel.	Depth, meters	Separate readings of the thermometers			Temperature accepted, °Cel.
urs	Minutes						
2	25	19	50	31.5	31.5	31.5	31.5
1	40	18	100	31.55	31.55	31.55	31.55
2	25	19	200	31.6	31.55	31.55	31.55
1	40	18	300	31.7	31.65	31.65	31.65
1	40	18	400	31.95	31.9	31.9	31.9
1	40	18	500	32.15	32.05	32.05	32.05
1	40	18	600	32.2	32.1	32.1	32.1
1	40	18	700	32.45	32.45	32.4	32.45
1	40	18	800	32.7	32.7	32.7	32.7
2	25	19	900	33.05	33.0	32.95	33.0
2	25	19	1,000	33.5	33.5	33.5	33.5
2	25	19	1,100	34.0	33.9	33.9	33.9
2	25	19	1,140	34.0	34.0	34.05	34.0

The purpose of the measurements was to establish the temperature of thermal lt waters required for baths.--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(782) ABSTRACT OF THE INNSBRUCK MEETING OF THE COMMISSION OF TERRESTRIAL MAGNETISM AND ATMOSPHERIC ELECTRICITY OF THE INTERNATIONAL METEOROLOGICAL ORGANIZATION AND OF THE RESOLUTIONS ADOPTED SEPTEMBER 21-23, 1931

By H. D. Harradon

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No. 4, 1931, pp. 319-323.

In this article Harradon gives a summary of resolutions adopted by the mmission of Terrestrial Magnetism and Atmospheric Electricity of the Intertional Meteorological Organization on the following principal items:

1. Publication of the magnetic character-numbers.

2. Relations between the commission and the Association of Terrestrial Magnetism and Electricity of the International Union of Geodesy and Geophysics.

3. The various questions pertaining to the work during the Polar year.

4. Study of the relations of the moon and the magnetic elements.

5. The question of the location of new observatories for terrestrial magnetism and electricity.--W. Ayvazoglou.

(783) ABSTRACT OF THE INNSBRUCK MEETING OF THE INTERNATIONAL COMMISSION FOR THE POLAR YEAR 1932-33 OF THE INTERNATIONAL METEOROLOGICAL ORGANIZATION AND OF THE RESOLUTIONS ADOPTED SEPTEMBER 23-26, 1931.

By H. D. Harradon

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No. 4, 1931, pp. 324-332.

The principal matters brought before the sessions of the commission were indicated in the report of President D. la Cour, an abstract of which is given by Harradon.

In the second part of the article Harradon gives a summary of resolutions adopted at the Innsbruck meeting.--W. Ayvazoglou.

(784) SUMMARY OF THE YEAR'S WORK, DEPARTMENT OF TERRESTRIAL MAGNETISM, CARNEGIE INSTITUTION OF WASHINGTON

By J. A. Fleming

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 36, No. 4, 1931, pp. 333-340.

This is an extract from the annual report in Year Book No. 30 of the Carnegie Institution of Washington for the year July 1, 1930, to June 30, 1931.

The following principal items of the work carried out by the institution are mentioned: (1) Participation in formulation of plans for the Jubilee International Polar Year proposed in 1932-33; (2) interpretation of accumulated data and the study of magnetic correlations with other geophysical, solar, and cosmic phenomena; (3) study of magnetic records and tabulations derived from observations at Watheroo, Western Australia, during the 12 years 1919-1930; (4) investigation of correlation of the initial impulses of magnetic storms; (5) investigations in atmospheric electricity; (6) carrying out of programs at the Watheroo and Huancayo observatories concerning magnetic, atmospheric-ectric, earth-current, and meteorological observations; (7) demonstration measurements of the artificially produced beta and gamma rays of energies uivalent to most of those emitted by radioactive substances, using equipment eveloped at the Department; (8) reductions and compilations of the work in ysical and chemical oceanography from observations made aboard the "Carnegie";) instrumental advances for magnetic and electric determinations.

The following theoretical investigations, mostly in continuation of those ted in the last year's summary, are given: (1) Solar activity and secular riation; (2) magnetic activity; (3) magnetic storms; (4) arctic magnetic arts; (5) magnetic work at sea and dynamic-deviation investigation; (6) otographic method of changing the ratio of ordinate scale to abscissa scale;) atmospheric pollution.

The first of a contemplated series of manuscripts giving detailed des- riptions of the department's specially designed apparatus required in its search fields was completed by Torreson. A second manuscript by Gish on e earth-resistivity apparatus is in preparation.--W. Ayvazoglou.

(785) WISSENSCHAFTLICHE UND PRAKTISCHE AUFGABEN DER ANGEWANDTEN GEOPHYSIK

(SCIENTIFIC AND PRACTICAL PROBLEMS OF APPLIED GEOPHYSICS)

By O. Meisser

Berichte Freiberger Geologischen Gesellschaft, vol. 13, 1931, p. 44.

The translation of the abstract published by M. Henglein in the "Neues hrbuch für Mineralogie, Geologie, und Paläontologie," 1931, No. 5, p. 628, ads as follows:

The purpose of applied geophysics consists in carrying out structure in- estigations of physical fields on the surface of the earth. The pure physi- l problems consist of development the necessary methods by using correspond- g instruments, and of collecting the proper constant data. Based on these thods practical application of geophysics in mining is possible; a great mber of geological problems may be disclosed by corresponding geophysical rveys over large areas.

Improvements in instruments used for pendulum measurements are discussed. using the three new Jena methods of observation and the apparatus for the lative gravity measurements the gravity difference can be determined multaneously at several stations with an accuracy corresponding to that of e torsion-balance measurements.

The principle of the Eötvös torsion balance is explained by an example lating to brown-coal investigation. Combination of the torsion balance and ndulum is mentioned.

Concerning magnetic measurements some arrangements of H and Z components by which the variations of the components can be determined were shown. The progress in electrical methods of measurement is explained. The possibility of determining single layers by seismic methods is mentioned.

Attention is drawn to radioactive and geothermal measurements. Emphasis is laid upon the necessity of further developing instruments and methods. The importance of detailed measurements of smaller areas with regard to gravity and magnetic elements, and in solving geological and industrial questions is especially stressed.--W. Ayvazoglou.

(786) SUMMARY OF THE GEOLOGICAL CONFERENCE (IN RUSSIAN)

By A. M.

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 11, No. 11/12, 1931. pp. 3-7.

In this summary the author mentions Schlumberger's electrical coring and its usefulness in determining the character of formations traversed in drilling Four French parties have been working in Baku since 1930.

Geophysical section reported on electrical, gravitational, and magnetic methods of prospecting carried out by the Azneft. The conference considered it necessary to have six parties for carrying out electrical coring in Baku and one each in the Grozneft, Turkmenneft, and Uzbekneft. The organization of a series of parties for electrical and magnetic prospecting was also decided.--W. Ayvazoglou.

(787) NEW OIL RESERVES (IN RUSSIAN)

By K. Riabinin and G. Helkvist

Azerbaidjanskoe Neftianoe Khoziaystvo, Baku, vol. 11, No. 11/12, 1931, pp. 101-105.

The authors describe a series of new probable locations of oil discovered by various geophysical methods of prospection. The most important of them are as follows:

Peninsula of Apsheron. Anticline structure was detected by electrical methods of prospecting at several places (Giurgiani-Zyria, Zykh, Kala, and others.

Prikurinsk Region (region along the Kura River). Several anticlines were discovered by electrical and magnetic methods of prospecting.

A series of geophysical exploration works is planned in many other regions --W. Ayvazoglou.

(788) ELECTRIC MICROMETER APPLIED TO MEASURING VIBRATION AND STRAIN

Editorial note

The Iron Age, New York, vol. 129, No. 10, 1932, p. 620.

A vibration detector recently developed in the general engineering labor-
ories of the General Electric Co., Schenectady, is described. Somewhat like
e seismograph for recording earthquake tremors, this vibration-detecting de-
ce is an application of the electric micrometer. The description of the de-
lopment of a pressure detector and a strain gage employing the same principle
given also.

Some details of the devices and of their operation are discussed.

Photographs are added.--W. Ayvazoglou.

(789) GEOPHYSICS PAPERS RICH IN THEORY AND PRACTICAL DATA

By Sherwin F. Kelly

Mining and Metallurgy, New York, vol. 13, No. 303, 1932, pp. 118-119.

This is a brief report on articles presented at the sessions devoted to
ophysics during the February meeting of the American Institute of Mining and
tallurgical Engineers in New York. Papers concerning various methods of
ophysical exploration, as well as those of special interest to oil men are
umerated.--W. Ayvazoglou.

9. NEW BOOKS.

90) Stutzer, O. Erdöl: Allgemeine Erdölgeologie und Überblick uber die Geologie der Erdölfelder Europas (Petroleum. General petroleum geology and a short account of the geology of European oil fields). Gebrüder Bornträger, Berlin, 1931, 628 pp., 199 figs., price $15; special to A.A.P.G. members $11.25. The book is essentially a compilation of the literature on the subject.--W. Ayvazoglou.

91) Texas Gulf Coast Oil Scouts Association and South Louisiana Oil Scouts Association. Oil and Sulphur Development in the Texas and Louisiana Gulf Coast Salt Dome Region. Bulletin 1, Houston, 1931, 128 pp., maps, sections, tables. Contains compilation of data on the Gulf Coast.

92) Woolnough, W. G. Report on tour of inspection of the oil fields of the United States of America and Argentina and oil prospects in Australia. 1931, 119 pp., 36 illus. Department of Home Affairs, Canberra, F. C. T., Australia. Price, 5 s. The book gives a brief account of the American oil geology and exploration

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DEPARTMENT OF COMMERCE - BUREAU OF MINES

GEOPHYSICAL ABSTRACTS[1]

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Senior physicist, U. S. Bureau of Mines.

1. GRAVITATIONAL METHODS

(794) EIN STATISCHER SCHWEREMESSER

(A STATICAL APPARATUS FOR GRAVITY MEASUREMENTS)

By H. Haalck

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 1/2, 1932, pp. 17-30.

In a previous article published under the title of "Ein statischer Schweremesser" (see Geophys. Abs. 23, p. 62) the author had shown that the question of the development of a statical apparatus for gravity measurements was brought very close to its solution and that therefore further experiments could be carried on with the hope of solving this problem definitely.

In this article Haalck describes the construction of an improved instrument by which practical measurements of the terrain could be made.

Contents of the article:

1. Fundamental principles for constructing apparatus for gravity measurements: (a) Dynamic methods; (b) static methods.

2. Theory of the barometric principle.

3. Methods for obtaining the necessary sensitivity.

4. Reading device.

5. Arrangement of levels and foot screws.

6. Influence of temperature changes upon the readings.

7. Elimination of the influence of temperature.

The purpose of Haalck's investigations is to develop an apparatus for gravity measurements by which the difficult and complicated methods of pendulum measurements can be replaced by quicker and simpler methods.

The article is to be continued.--W. Ayvazoglou.

(795) RECHERCHES SUR LES FILS D'ÉLINVAR

(INVESTIGATIONS ON ELINVAR WIRES)

By Boris Perebaskine

Annuaire de l'Institut de Physique du Globe, 1928.

The work described concerns investigations on elinvar wires carried out B. Perebaskine, under the direction of M. Rothe, especially with regard to e influence of the temperature. Two wires, one 0.08 millimeter in cross-ction and 66 centimeters long, and the other 0.08 millimeter in cross ction and 20 centimeters long, were examined during 40 days. Temperature anges were of the order of 7° C. The equilibrium was affected only by rea-n of untwisting of the wire. This could certainly be avoided by careful nufacturing of the wire. The results of examinations carried out in a room ated to a temperature not over 57° C. are given in a table. The coefficient elasticity was equal to 4.54.

The figures given in the table concern a wire of 0.08 millimeter in oss section and 66 centimeters long; they show clearly that untwisting was fluenced by the time, but that during the same period of time the wire was ly very little affected by temperature; the mean value of the duration of cillations was equal to about 8 minutes and 35 seconds.

From the observations the author draws the conclusion that during a ries of measurements carried out with Eötvös' torsion balance the influence temperature can be greatly reduced if an elinvar wire of proper constitu-on and dimensions, similar to that examined, is used.--W. Ayvazoglou.

(796) BEITRAG ZUR THEORIE UND PRAXIS DER REFERENZPENDEL-MESSUNGEN UNTER ANWENDUNG VON MINIMUMPENDELN

(CONTRIBUTION TO THE THEORY AND PRACTICE OF REFERENCE-PENDULUM MEASUREMENTS BY USING MINIMUM PENDULUMS).

By A. Berroth

eitschrift für Geophysik, Braunschweig, vol. 8, No. 1/2, 1932, pp. 30-39.

In this article the author discusses the possibility of eliminating the me scale of the absolute measuring system in which, according to the old thods, the time of oscillations of a pendulum must be expressed by intro-cing a reference-pendulum (in practice several) which is used as a station-y pendulum and is observed simultaneously.

Theoretical principles of the reference-pendulum measurements are amined and a method showing how minimum pendulums can be used is developed.

In conclusion a numerical example is given.--W. Ayvazoglou.

(797) SCHWERE UND GEOID BEI ISOSTASIE

(GRAVITY AND GEOID IN THE ISOSTASY)

By Karl Jung

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 1/2, 1932, pp. 40-52.

Isostatic anomalies calculated in the usual way differ slightly from zero, as also does the isostatic structure of the earth's crust, because the geoid undulations are not taken into consideration in making the reduction for the level, and the relation between the surface relief and density (Pratt), respectively, and the surface relief and thickness of the earth's crust (Airy), which forms the basis for the reduction of masses, is not strictly correct owing to the convergence of the earth's radii and an irregular gravity in the earth's crust.

Spherical function developments for the geoid undulations, the free-air anomaly, and the isostatic anomaly in case of the isostatic structure of the earth's crust as determined in the usual way, are calculated, then numerical values are found up to the spherical function of the seventh order and represented in three figures.--Author's abstract translated by W. Ayvazoglou.

(798) A NEW INSTRUMENT FOR MEASURING VERY SMALL DIFFERENCE IN GRAVITY

By Kenneth Hartley

Physics, Menasha, Wis., vol. 2, No. 3, 1932, pp. 123-130.

Description of a new portable instrument for measuring relative values of gravity to within 2 or 3 parts in 10 million, specially designed for geophysical exploration. The principles of the design are analysed and the methods for eliminating effects of elastic hysteresis, temperature changes, variations in the barometric pressure, etc., are discussed. Also effects of initial stresses in materials, defects in alignment of locking mechanism, inaccurate leveling, etc. These difficulties are serious but seem to have been overcome. Results of preliminary field measurements near Houston, Tex., are presented and some comparison is made between the type of information given by this instrument and by the torsion balance.--Author's abstract.

(799) CHARTS FOR TORSION BALANCE READINGS

By M. M. Slotnick

Physics, Menasha, Wis., vol. 2, No. 3, 1932, pp. 131-133.

The calculations necessary to determine the values of the gradient and curvature quantities from the readings taken at a torsion balance station involve either slide-rule or logarithmic manipulations. The author shows here that the result obtained by writing the equations involved in linear forms of the type given in this article is well within the accuracy of the instrument.

A pair of charts can readily be made for each instrument when used in ° azimuth settings and another pair for 120° azimuth settings. Two charts de for field use for a Bamberg instrument for the 120° of settings are pended and the equations for this particular instrument in this case are ven.--W. Ayvazoglou.

(800) THE EFFECT OF HEAT TREATMENT OF FINE METALLIC SUSPENSIONS

By N. N. Zirbel

Physics, Menasha, Wis., vol. 2, No. 3, 1932, pp. 134-138.

When a suspended system is supported by a fine wire the equilibrium posi- on usually changes slowly for a long time after the load is applied. The uilibrium position also changes with temperature. It is found that both of ese disturbing factors can be eliminated by a suitable heat treatment of the re. Observations have been made on tungsten and platinum-iridium wires of zes suitable for use in the Eötvös torsion balance. Apparatus and procedure, well as the results obtained from the experiments, are discussed.--Author's stract.

2. MAGNETIC METHODS

(801) UBER REMANENTEN MAGNETISMUS VON GESTEINEN

(ON THE REMANENT MAGNETISM OF ROCKS)

By J. Koenigsberger

rlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 2, 1932, pp. 204-216.

The question of the remanent magnetism of rocks is discussed under the llowing headings:

1. Relative remanence of rocks in natural conditions and after being ated in laboratorium in the earth's field: Values for a series of rocks vestigated are given.

2. Causes of a relatively small remanence: The following main reasons e mentioned: (a) Displacements inside of rocks at a temperature at which, well as below which, no magnetism worthy of notice is produced; (b) dis- acements in rocks at temperatures above 400°; (c) various ages of eruptive cks; (d) oscillations and repeated heating and cooling; (e) coercive force.

3. Components of magnetization and constancy of the initial permeability: Corresponding to the constancy of the initial permeability the remanence is, in case of low field forces, proportional to them (± 3%). The vectorial resolution of the remanent magnetization into components was proved to be possible.

4. Demagnetization in the earth's field at temperatures below 585°: According to the experiments a temperature of about 500° is sufficient to produce in the earth's field a reversal magnetization.

5. Influence of the period of time of the magnetization and of the demagnetization on the remanence: It is proved by the experiments that time has influence upon the origin of the magnetization and its disappearance, as well as upon the reversal magnetization.--W. Ayvazoglou.

(802) ZUR HAALCKSCHEN THEORIE DES ERDMAGNETISMUS

(CONCERNING HAALCK'S THEORY OF EARTH MAGNETISM)

By T. Schlomka

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 1/2, 1932, pp. 84-87.

The author points out that errors have crept into Haalck's theory of earth magnetism. According to Haalck's statement the conclusion must be drawn that, based on Haalck's theory, the revolving earth produces a magnetic moment of a unit of volume which is at least 10^{14} smaller than the mean magnetization density of the earth's body necessary for the explanation of the magnetic field which is really observed.--Author's abstract translated by W. Ayvazoglou.

An explanation concerning Schlomka's statement is given by H. Haalck in his "Erwiderung" (Answer), published in the same number of the Zeitschrift für Geophysik, p. 88.--W. Ayvazoglou.

(803) MAGNETIC SURVEYS OVER MINERAL, DIABASE, AND ARTIFICIAL DYKES

By A. S. Eve and D. A. Keys

The Canadian Mining and Metallurgical Bulletin, No. 239,
March, 1932, pp. 119-125.

In this paper the authors examine magnetic surveys carried out with the modern Askania types of vertical and horizontal variometers over magnetic dyke in the Sudbury region. The interpretation of the results has been confirmed by diamond drilling in some cases, and by experiments over models. Curves representing vertical and horizontal variations are given. Directions and magnitude of resultant vectors of magnetic anomalies at points above a pyrrhotite-nickel dyke and a diabase dyke, indicating overburdens of approximately 140 feet and 600 feet, respectively, are drawn.--W. Ayvazoglou.

3. SEISMIC METHODS

(804) UNITED STATES EARTHQUAKES, 1930

By Frank Newmann and R. R. Bodle

Coast and Geodetic Survey, U. S. Department of Commerce,
Washington, D.C., Serial No. 539, 1932, 26 pp.

This publication includes earthquakes of regions under the jurisdiction the United States, though for the Hawaiian and the Philippine Islands rthquakes of volcanic origin are not included and only severe earthquakes e included for the Philippine Islands, since reports are published in Manila rthquakes adjacent to the United States and felt within its borders or those the regions under its jurisdiction are described, except that, in a general scription only is given of Canadian earthquakes felt within the United States, details are available in the Canadian report. The principal earthquakes of e year which were widely recorded are given regardless of location, and strumental details for these are included.

Four illustrations showing the areas affected by shocks are given in the ticle.--W. Ayvazoglou.

(805) EARTHQUAKE NOTES

By R. R. Bodle

Eastern Section, Seismological Society of America,
Washington, D.C., vol. 3, No. 4, 1932, 12 pp.

The following articles are discussed in this issue:

1. The North Mississippi earthquake of December 16, 1931: The informa- on used in compiling this preliminary report was obtained through the coopera- on of postmasters, weather observers, and others. The final report on this ake will be published by the Coast and Geodetic Survey in "United States rthquakes, 1931."

2. The Georgetown seismological observatory, by J. S. O'Connor. A scription of the equipment and work of this observatory is given.

3. Mexico's first skyscraper and earthquakes: According to a recent port of the Department of Commerce, the first skyscraper in Mexico has been signed to withstand earthquake shocks with a maximum acceleration of 65 ntimeters per second per second. The building is now under construction.

4. A new vertical-component seismometer: A statement concerning this new Benioff vertical seismometer which has been developed at the Seismological Laboratory in Pasadena is given. Its advantages are enumerated.

5. Other points of interest -- The advisory committee report concerns devices designed in the Seismological Laboratory, such as: (a) An automatic switching device assigned to increase the brilliancy of the recording lamps during the brief interval of greatest motion while a quake is being recorded; (b) a "wave seismometer"; (c) a "seismic frequency meter."

6. A photocell attachment for seismographs, by John P. Delaney. The photocell alarm described in this article notifies the office in case the pendulum moves off its zero position, whether from accident or an earthquake, and it also makes possible the removal of the record before the long waves and maxima have obliterated the less obvious preliminaries in the case of serious eqrthquakes.

7. University of Wisconsin -- new station.

8. Two-hundred-ton dynamite explosion. Preliminary information on the explosion carried out by the Inland Lime and Stone Co. at Manistique, Mich., is given.

9. Earthquakes and building code. The building code recommended by the National Board of Fire Underwriters (fifth edition, completely revised, 1931).

10. Navy-Princeton expedition.

11. Santiago, Cuba, earthquake of February 3, 1932.

12. Items of interest. Some items in which members of the eastern section may be interested are mentioned.

13. Epicenters. A list of epicenters determined since the last issue of the Earthquake Notes is given.--W. Ayvazoglou.

(806) BLASTING IN SEISMIC WORK

Editorial note

Engineering and Mining Journal, New York, vol. 133, No. 2, 1932, p. 77.

Methods commonly used in shot planting in commercial seismology are described. A recent innovation in shot planting, according to the Atlas Powder Co., is the use of a portable rig for drilling holes from 60 to 100 feet deep and lowering the charge in torpedo-shaped cans. These holes do not crater and can be used repeatedly, although to use them over five or six times is not recommended.

A table which may be useful in calculating the desired charge for loading a deep hole is given.--W. Ayvazoglou.

(807) UNTERSUCHUNG DER SCHALLAUSBREITUNG BEI UNTERWASSER EXPLOSIONEN

(INVESTIGATIONS OF SOUND PROPAGATION CAUSED BY UNDER-WATER EXPLOSIONS)

By W. Beuermann

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 1/2, 1932, pp. 1-16.

The headings of this article are as follows: (1) Purpose of the work; 2) apparatus; (3) place of experiments; (4) results of experiments carried out in the Baltic Sea; (5) interpretation; (6) process of the explosion; 7) experiments carried out in the laboratory; (8) gas bubble oscillations; nd (9) theoretical considerations.

A translation of the author's summary reads as follows: Experiments were carried out in the Baltic Sea to determine the travel-time curves produced by underwater explosions of small charges. It was shown how the travel-times of a sound could be measured with great accuracy by using a 2-gram low-tension detonator fuse as a source of the sound and an apparatus for oscillographic registration at the receiving station. It was proved that the registered sound did not travel through the layers with higher sound velocity, as could be expected according to analogous experiments in seismics, but propagated in the water with normal velocity. Distances used for measurements were equal to 450, 2,000, and 5,000 meters; within these limits the travel-time curve was a straight line.

From the oscillograms the author determined that the detonation was not epresented at the receiving station as a short and sharp sound, but that here were lasting oscillations similar to those of an echo. The duration of his echo increased with the increase of the distance. The first part of the ound curve was independent from the distance and frequencies of from 600 to 00 Hertz prevailed in this part of the curve, while in the second part of he curve the frequencies were mostly equal to 200 to 250 Hertz.

By experiments carried out in the laboratory it was proved that under he most different experimental conditions the gas bubble produced by the explosion was oscillating radially; the dependence of its oscillating frequency rom the content of salt and from pressure was also measured.

A formula for the calculation of this frequency was derived empirically.-- . Ayvazoglou.

(808) SEISMISCHE UNTERSUCHUNGEN DES GEOPHYSIKALISCHEN INSTITUTES IN GÖTTINGEN

(SEISMIC INVESTIGATIONS CARRIED OUT BY THE GEOPHYSICAL INSTITUTE IN GÖTTINGEN)

By F. Gerecke, H. K. Müller, A. Ramspeck, and R. Köhler

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 1/2, 1932, pp. 65-84.

The article consists of three main parts. Part I is entitled "Measurements Carried Out on the Rhone Glacier." Preliminary information concerning this part, the purpose of which was to carry out seismic measurements of the glacier bed and to study the propagation of the seismic energy by simultaneous registration of the components of the elastic waves by means of two similarly constructed horizontal seismographs and one vertical seismograph, is given in the following two chapters:

1. The travel-time curve, by F. Gerecke. The thickness of the ice was measured by means of five longitudinal profiles and one cross profile. The results for a fixed profile, calculated according to various methods, are given in a table. The curves are shown in a diagram.

2. Azimuth and the angle of emergence of the displacement of P and S, by H. K. Müller. The following items are considered: (1) Instruments; (2) examination of the instruments; (3) direction of the shock of P_1; (4) angle of emergence of P_1; (5) angle of emergence of P_{121}; (6) periods; (7) direction of oscillation of S_1; (8) amplitudes of S_1.

Part II. Shaking table for investigating seismographs, by A. Ramspeck. A description of a shaking table constructed by Ramspeck is given. The movements of the table, as well as those of the seismograph, are registered photographically. The effect produced by the movement is examined. A schematical design of the table and diagrams showing the registrations of shocks and periodical movements are given.

Part III. A new method for examination of seismographs, by R. Köhler. The author describes a simple method of examination by which the inert mass is forced to vibrate by means of a rotating flywheel provided with an eccentric additional mass. The observed amplitudes which are drawn as functions of the period give directly the true magnified curve of the seismograph; this is proved by calculation and experiments. The method is especially useful for determining the harmful natural vibrations of a seismograph.--W. Ayvazoglou.

(809) VELOCITY OF ELASTIC WAVES IN GRANITE

By L. Don Leet and W. Maurice Ewing

Physics, Menasha, Wis., vol. 2, No. 3, 1932, pp. 160-173.

Items of the article:

1. Location.
2. Method.
3. Instruments.
4. Firing positions.
5. Quincy results.
6. Rockport results.
7. Westley results.
8. Average longitudinal velocity.
9. Analyses: Chemical; mineralogical.
10. Discussion: Seismic waves registered at La Courtine; comparison of laboratory and field results; relation between compressibility of granite and pressure.
11. Acknowledgments.

The velocity of elastic waves in granite was determined at Quincy and ockport, Mass., and Westerly, R. I. The waves measured were generated by ynamite explosions. They were recorded by portable seismographs at distances anging from 50 to 4,600 feet. The observed velocities for longitudinal waves ere:

Quincy ..... 16,260 ± 70 ft./sec. or 4.96 ± 0.02 km./sec.[x]
Westerly .... 16,400 ± 120 ft./sec. or 5.00 ± 0.04 km./sec.
Rockport .... 16,670 ± 40 ft./sec. or 5.08 ± 0.01 km./sec.
Average ..... 16,530 ± 90 ft./sec. or 5.04 ± 0.03 km./sec.

[x] The ± values given in this paper are probably errors.

A three-component seismograph, used only at Quincy, recorded transverse aves, the velocity of which was 8,150 ± 90 ft./sec., or 2.48 ± 0.03 km./sec. rom the two velocities determined at Quincy and the density of specimens aken from the shooting locations, 2.65 grams/cm.^{3}, values for the bulk odulus, K, compressibility, β, rigidity, μ, Poisson's ratio, σ, and oung's modulus E, were obtained as follows:

$K = 44 \pm 1 \times 10^{10}$ dynes/cm.^{2}; $\beta = 2.28 \pm 0.05 \times 10^{-12}$ cm.^{2}/dynes;
$\mu = 16.3 \pm 0.4 \times 10^{10}$ dynes/cm.^{2}; $\sigma = 0.333 \pm 0.005$;
$E = 43 \pm 1 \times 10^{10}$ dynes/cm.^{2}

he form of the time-distance curves, straight lines through the origin, ndicated that the waves did not penetrate deeply. Accordingly, the values obtained are for pressures only of a few atmospheres. The bearings of these results upon earlier investigations of the elastic constants of granite are discussed. Although direct comparisons between laboratory and field results are not conclusive, they indicate that the Adams and Williamson curve is incorrect for pressures below 2,000 megabars, and that there is no marked difference between dynamically and statically determined compressibilities of granite.--Authors' abstract.

(810) ASYMMETRY OF SOUND VELOCITY IN STRATIFIED FORMATIONS

By Burton McCollum and F. A. Snell

Physics, Menasha, Wis., vol. 2, No. 3, 1932, pp. 174-185.

In the course of explorations of subsurface geology by the seismograph the authors have frequently observed the pronounced effect of stratification on the velocity of seismic waves in shales, and this effect has often been utilized in practical seismography.

Recently an opportunity was afforded for securing additional quantitative data on the velocity normal to and parallel to the bedding planes. The paper points out that the velocity parallel to the planes of stratification is, in some instances, as much as 50 per cent higher than the velocity in a direction normal to the bedding planes. It is shown also that inclined stratified beds exhibit a higher apparent point-to-point velocity when sound travels in an up-dip direction than when travelling down-dip. The paper describes a procedure whereby this effect may be utilized for determining the direction and approximate magnitude of the dip in such stratified deposits. The method has proved to be of considerable practical importance where the stratified formations are obscured by overlying deposits.--Authors' abstract.

(811) THE CALCULATION OF THE MOTION OF THE GROUND FROM SEISMOGRAMS

By H. A. Wilson

Physics, Menasha, Wis., vol. 2, No. 3, 1932, pp. 186-199.

The equation of motion of a mechanical seismograph is $-x = y + 2ky + p^2y$, where x is the ground displacement and y the seismograph deflection. This equation may be solved for y when x is supposed known or for x when y has been observed as a function of the time. In this paper both of these ways of solving the equation are considered. The motion of the seismograph due to a train of waves starting at t = 0 is considered and also the motion due to the arrival of a single wave. In each case seismographs with several periodic times and either undamped or critically damped are considered. Curves are given showing the motion of the ground and the calculated motion of the seismograph. The motion of the ground corresponding to several simple assumed seismograms is also worked out and shown by means of curves. The tion corresponding to a given seismogram depends greatly on the periodic me and damping of the seismograph. Finally the ground motion is deduced om two actual seismograms due to dynamite explosions. An integraph is scribed which enables the calculations to be done more quickly.--Author's stract.

812) POSSIBILITY OF FREE OSCILLATIONS OF STRATA EXCITED BY SEISMIC WAVES

By Katsutada Sezawa and Kiyoshi Kanai

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 1, 1932, pp. 1-18.

In this paper the authors are dealing with the problem of transmission seismic waves of oscillatory type and of finite extent through strata of fferent elasticities, densities, and thicknesses. Conclusions on the ture of the free vibrations of strata due to seismic waves, based on thematical discussion, are derived.--W. Ayvazoglou.

(813) NOTES ON THE WAVES IN VISCO-ELASTIC SOLID BODIES

By Katsutada Sezawa

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 1, 1932, pp. 19-22.

From the numerical examples given in this article Sezawa concludes that t is ascertained that in the possible case of dispersion the waves are mped away during a very small fraction of a second; that is to say, they e damped in a short distance even within a fraction of the length of very ort waves. Hence, it may be concluded that the waves, whose velocity is fected by the viscosity of the solid, can not be transmitted to any short stance, so that the investigation of the dispersion of waves due to its mping nature is obviously meaningless."--W. Ayvazoglou.

(814) STUDY OF THE PROPAGATION OF SEISMIC WAVES

By Hiroshi Kawasumi

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 1, 1932, pp. 94-129.

The principal aim of this paper is the examination of new methods for udying the propagation of seismic waves.

Chapter 1 deals with the determination of the velocity of P-wave, from e analysis of travel-times of the earthquake on May 21, 1928, which occurred Chiba prefecture (selection of the method; effect of the surface crust and duction to the level surface of the ultra-basaltic layer; numerical calculaon; discussion of the results).

Chapter 2. Determination of the velocity of S-wave.

Chapter 3. Provisional calculation of time-distance curves for various hypocentral depths up to 500 kilometers.

In the appendix the author makes a reexamination of the velocity of P-wave and the accuracy of the values calculated in Chapter 3. The comparison of the results is given in tables.--W. Ayvazoglou.

(815) COMPARAISON ACCÉLÉROMÉTRIQUE DES SECOUSSES SISMIQUES DANS DEUX PARTIES DE LA VILLE DE TOKYO

(COMPARISON OF ACCELERATIONS OF SEISMIC SHOCKS IN TWO PARTS OF TOKYO)

By Mishio Ishimoto

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 1, 1932, pp. 171-187.

In a previous paper (see Geophys. Abs. 34, p. 362) the author had shown that the seismic shocks observed on the surface of the earth do not have the characteristics of waves generated directly at the focus of an earthquake. These primary waves excite in the superficial layer secondary waves which constitute the greatest part of the record of a seismogram. This is proved especially by the records obtained in Hongo with the acceleration seismograph.

In this article Ishimoto gives a description of his observations on seismic shocks carried out in two parts of the City of Tokyo in order to compare their characteristics. Based on the results of these observations it was established that the seismic disturbances at two places were entirely different - the period, as well as the amplitude. Thus he draws the conclusion that the primary wave is an important factor by which the changes of the phase of the shock is caused but that the period, the amplitude, and the duration of the shock is determined entirely by the conditions of the superficial layer.

Curves and seismograms are added.--W. Ayvazoglou.

(816) A PORTABLE HORIZONTAL PENDULUM SEISMOMETER

By Fuyuhiko Kishinouye

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 1, 1932, pp. 188-191.

A new portable seismometer constructed by the author which is lighter than those which have been made before is described. A photograph of the seismometer equipped with a synchronous motor for driving the recording drum is given.--W. Ayvazoglou.

4. ELECTRICAL METHODS

(817) COMMUNICATION SUR LE CAROTTAGE ELECTRIQUE

(COMMUNICATIONS CONCERNING ELECTRICAL CORING)

By C. and M. Schlumberger

II-e Congres International de forage, Paris, September, 1929, pp. 1-14.

By "electrical coring" the authors designate an operation by which the ure of rocks opened by drilling can be determined inside of the untubed t of the well by means of electrical resistivity measurements. Therere the purpose of this operation consists of geological investigation of ground, similar to the "mechanical coring" ordinarily used.

The present communication is divided into three parts: The first deals h the resistivity of rocks in general, since these rocks are characterized means of electrical parameters. In the second part the technique of the surements adopted by the authors is discussed. Finally, in the third part authors give a summary of the application of "electrical coring," as well the results obtained from observations made in Pechelbronn, where this hod was used regularly for more than one year.

Practical examples are shown in a series of diagrams of resistivity as ermined for a number of boreholes.--Authors' abstract translated by Ayvazoglou.

(818) UNTERSUCHUNGEN ÜBER DIE ELEKTRISCHE RAUMLADUNG UND DAS ELEKTRISCHE FELD AM BODEN

NVESTIGATIONS CONCERNING THE ELECTRIC SPACE CHARGE AND THE ELECTRIC FIELD ON THE GROUND

By Irmgard Hahnfeld

itschrift für Geophysik, Braunschweig, vol. 8, No. 1/2, 1932, pp. 89-106.

Contents of the article:

1. Apparatus.
2. On the inertia of the radioactive probes.
3. Results of experiments of parallel registrations of the air potential and space charge on a platform and on the field.
4. Measurements carried out with an earth-charging apparatus and with a potential-probe.

The purpose of the work consisted in investigating the relations between the electric space charge and the electric field on the ground. Photographically registered were:

1. The electric surface charge of the earth.
2. The electric space charge of the air.
2. The potential difference between the surface of the earth and one point in the air, h meters above the ground.

The translation of the author's abstract reads as follows: "An instrument for automatic registration of the earth's surface charge was constructed and parallel registrations of the air potential, space charge, and surface charge were carried out. The theory of the instrument was discussed; then, based on the potential theory, a layer of space charge on the ground was established by observations and its thickness (a few meters) was calculated. Inside of this a second layer a few decimeters thick and of ten times higher space charge density was supposed directly above the ground.--W. Ayvazoglou.

(819) SOME ASPECTS OF ELECTRICAL PROSPECTING APPLIED IN LOCATING OIL STRUCTURES

By Leo J. Peters and John Bardeen

Physics, Menasha, Wis., vol. 2, No. 3, 1932, pp. 103-122.

Electrical prospecting is defined as the science and the art of determining the variations of the electrical constants (resistivity, magnetic permeability, and the dielectric constant) of the earth's crust and of interpreting these variations in terms of geological structure. The most successful systems of prospecting are based on the study of resistivity variations. The basic assumption made is that in general changes of resistivity follow the bedding planes. Electrical methods of exploration may be divided into two classes: direct-current methods and alternating-current methods.

In Part II the fundamental theory of direct-current method is discussed and a typical survey is described.

Part III deals with the theory of alternating-current methods, with particular reference to the optimum frequency to be used. It is shown that in general very low frequencies are desirable. Two alternating-current surveys made by the Swedish American Prospecting Corporation are briefly described.

In the conclusion (Part IV) some of the difficulties of electrical prospecting are discussed. The depth to which investigations may be carried is limited. In the present stage of the art, it would take exceptionally favorable conditions to obtain reliable information much in excess of 2,000 feet. However, it is stated that improvements in methods of interpretation and in field technique should give electrical methods a definite field of usefulness in prospecting for oil.--Authors' abstract.

5. RADIOACTIVE METHODS

(820) NEUE FORSCHUNGEN ÜBER RADIOAKTIVITÄT

(NEW INVESTIGATIONS RELATING TO RADIOACTIVITY)

Editorial note

Petroleum Zeitschrift, Berlin, vol. 28, No. 11, 1932, p. 12.

A brief summary of a lecture delivered by Prof. O. Hahn before the erein Deutscher Chemiker" in March, 1932, on the results of his investiga-ons concerning radioactivity is given. According to Hahn the extremely gh sensitiveness of the new methods of measurements makes it possible to tablish radiation specific for each radio element even in the case of one llion millionth part of 1 gram of the substance.

Methods of investigations, especially the emanation method, were dis-ssed.--W. Ayvazoglou.

(821) DAS WESEN DER ULTRASTRAHLUNG

(THE NATURE OF THE PENETRATING RADIATION)

By Jenő Barnothy and Magdalene Forro

Zeitschrift für Physik, Berlin, vol. 71, No. 11/12, 1931, pp. 778-791.

The purpose of this work consisted in examining the influence of the rthmagnetic field on the penetrating radiation.

From the fact of the existence or absence of this influence a conclu-on can be drawn as to whether the radiation is of a corpuscular or wave ture. In order to determine this the authors investigated the intensity distribution of cosmic radiation along the directions perpendicular to magnetic meridians W. 50° and E. 140°. Maximum of intensity was found 90° and 120°.

The arrangements of the investigations made according to two methods described. The results are shown in tables and diagrams.--W. Ayvazoglou.

(822) DIE SPEZIFISCHE IONISATION DER HÖHENSTRAHLUNG

(SPECIFIC IONIZATION OF THE PENETRATING RADIATION)

By W. Kolhörster and L. Tuwim

Zeitschrift für Physik, Berlin, vol. 73, No. 1/2, 1931, pp. 130-136.

Tuwim's theory of the vertical countertube effect contains a constant N_0 which is analogous to the constant J_0 in the formula:

$$J = J_0 V \Phi (\mu H)$$

derived for the ionization chambers. It is shown that the specific ionization of the penetrating radiation K is equal to:

$$K = J_0 / N_0$$

K is calculated from experimental values obtained for J_0 and N_0 as being equal to 135 ions cm^{-1}, that is three times greater than in the case of the most rapid radioactive β-rays. The specific ionization K allows us to determine the lower limit for the energy of a single radiation ray to be equal to 2.10^9 e volts. This calculation is independent from any hypothetic assumption on the nature and absorption capabilities of the penetrating radiation.--Authors' abstract translated by W. Ayvazoglou.

(823) ZUR VERTEILUNG RADIOAKTIVER STOFFE IN DER FREIEN LUFT

(ON THE DISTRIBUTION OF RADIOACTIVE SUBSTANCES IN THE FREE AIR)

By J. Priebsch

Physikalische Zeitschrift, Leipzig, vol. 32, No. 16, 1931, pp. 622-629.

Based on the laws of the unregulated movement in the free air, the altitude distribution of emanations coming out from the ground, and their products of decomposition were calculated by V. F. Hess and W. Schmidt under the assumption that the interchange value does not depend on the altitude, and later by W. Schmidt under the assumption that the interchange increases with the increase of the altitude.

The very rapid decrease with the altitude calculated by taking into consideration W. Schmidt's later assumption seemed to agree with the observations of the vertical distribution of the radium emanation made by E. Schmidt in Graz, but this could not be considered decisive owing to the abnormal climatic conditions of the Graz basin. An error in Schmidt's calculations was disclosed, and a new calculation carried out for RaEm, ThEm, and ThB resulted in a considerably smaller decrease with the increase of the altitude.--W. Ayvazoglou.

6. GEOTHERMAL METHODS

(824) ON THE CORRELATION OF ISOGEOTHERMAL SURFACES WITH THE ROCK STRATA

By C. E. Van Orstrand

Physics, Menasha, Wis., vol. 2, No. 2, 1932, pp. 139-153.

Items of the article:

Regional variation of isogeothermal surfaces.
Local variations of isogeothermal surfaces.
Correction for surface topography.
Comments on the data of observation.
Causes of temperature variations.
Some general suggestions.

An instance of regional variation in Oklahoma and two cases of local riation, one at Long Beach, Calif., and the other at Salt Creek, Wyo., ve been selected for consideration from a large number of geothermal surys conducted during the past few years by the U. S. Geological Survey and e American Petroleum Institute. The causes of local and regional variaons are unknown. Possible explanation such as radioactivity, proximity crystalline rocks, and transfer of heat along the strata are given carel consideration in attempting to explain the observed relations between e strata and the isogeothermal surfaces.--Author's abstract.

(825) GEOTHERMAL GRADIENT DETERMINATIONS IN THE LAKE SUPERIOR COPPER MINES

By L. R. Ingersoll

Physics, Menasha, Wis., vol. 2, No. 3, 1932, pp. 154-159.

Contents of the article:

1. Method of temperature measurement: General procedure; thermometers; temperature readings.
2. Results: Theoretical interpretation of results.

The Michigan College of Mining and Technology, in cooperation with the lumet and Hecla Copper Co. and the author, is carrying out a program of nperature measurements in the deep copper mines of northern Michigan, tending the previous work of Agassiz and others.

Temperatures were measured with mercury thermometers mounted in baketе tubes, placed in drill holes in mine workings, where the rock has been eshly exposed, special attention being given the effects of drilling, asting, and other heat-conduction considerations. Present results give as the average gradient from the surface to 5,679 feet below (temp. 95.3° F.), 1° F. in 108.5 feet (0.0168° C./ meter). The gradient is more nearly uniform than has sometimes been supposed. A preliminary attempt has been made at calculating the previous "thermal history" of this region. Diffusivity of specimens of the rock measures 0.0075 c.g.s., and on this basis calculations of theoretical temperature-depth curves have been made for 25 different assumptions of previous temperature conditions, and compared with the actual curve. Results as yet are inconclusive but indicate that at least 30,000 years have elapsed since the last glacial epoch, a longer period than usually assumed.--Author's abstract.

(826) EARTH TEMPERATURES OF NORTH-CENTRAL TEXAS

By Virgil E. Barnes

Bulletin of the American Association of Petroleum Geologists, Tulsa, Okla., vol. 16, No. 4, 1932, pp. 413-416.

Temperature gradients, consequently isothermal surfaces, in north-central Texas are controlled by the proximity of the pre-Cambrian rocks to the surface. Unconformities probably also affect temperature gradients only inasmuch as they present angular relationships with better conducting rocks beneath poorer conducting rocks, or under exceptional conditions the reverse may be true. The present study indicates that a feasible explanation for the variation of geothermal gradients over anticlinal structure is the difference in conduction of heat by rocks.--Author's abstract.

(827) OIL-FIELD WATERS OF NORTH-CENTRAL TEXAS

By Virgil E. Barnes

Bulletin of the American Association of Petroleum Geologists, Tulsa, Okla., vol. 16, No. 4, 1932, pp. 409-411.

The mapping of geological structure in north-central Texas is only slightly facilitated by the results derived from the study of oil-field waters. However, application of facts already known can be of much value in regions which contain salt domes, or faults, where strongly saline solutions may approach the surface and intermingle with fresh or slightly saline solutions, thus producing abnormal waters for short distances from such features.--Author's abstract.

(828) MOVEMENTS IN THE EARTH'S CRUST

By J. S. Delury

Canadian Mining Journal, Gardenvale, vol. 53, No. 4, 1932, pp. 161-165.

After a brief discussion of the movements in the earth's crust caused by isostasy, the author says that there is still something missing in crustal theories.

In this article Delury makes an attempt to answer the question: What s the great force that has always been active in upsetting isostatic balance? nis force is evidently great enough to distort the earth and to overcome the ower of gravity. The appeal made at different times to astronomic forces, different contractions of the earth, to a changing form of the geoid rought about by change in rate of rotation, as well as many other possible ources of energy can not, according to the author, be considered sufficient- y effective distorting agents.

As heat is available from several sources within the earth the author s exploring the field offered by it for the explanation of earth distortion.

He says: An attempt is made to show that the earth's thermal condition, nd its thermal condition in the past as read from geological history, are ot in keeping with most conceptions of crustal mechanics, but are in keeping ith the hypothesis of sheet-flow in the subcrust. Heat migrates horizontal- y in the earth, not by conduction, but through the medium of migrating hot aterial. It is considered possible that heat so carried introduces direct nd indirect density effects in the outer earth, so that distortion is roduced to upset the conditions of isostatic balance and to initiate in hat way changes of level and consequent crustal deformation.

A brief discussion of relevant facts and theories concerning the earth nd its crust, as well as an outline of crustal phenomena and structures, is iven as a necessary preliminary to the development and application of the ypothesis outlined by the author.--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(829) PROSPECTION GEOPHYSIQUE DU SOUS-SOL

(GEOPHYSICAL PROSPECTING OF THE SUBSOIL)

Editorial note

Écho des Mines et de la Métallurgie, Paris, vol. 60, No. 3984, 1932, p. 176.

This note mentions the following two articles on geophysical prospecting pearing in the Annales des Mines:

1. Gravimetrical prospecting of the subsoil, by M. H. Galbrun (see ophys. Abs. No. 36).

2. Seismic prospection of the subsoil, by R. Maillet and J. Bazerque ee Geophys. Abs. No. 35).

The greater number of articles dealing with geophysical methods of pros- ecting appearing recently in the literature indicates, according to the thor, that the importance of these methods is constantly increasing. W. Ayvazoglou.

(830) ECONOMIC VALUE OF GEOPHYSICS IN MINING

By C. H. Wilson

The Mining Journal, Phoenix, Arizona, vol. 15, No. 21, 1932, pp. 3-5.

The object of this paper, according to the author, is to indicate the desirability of using corrective measures against the abusive practices often common in the initial stages of a mining enterprise, and to explain the role of geophysics as such a corrective device and an aid in placing mining on a basis more on a par with other enterprises.

The information supplied by geophysical surveys makes it possible to improve the efficiency in the conduct of mining enterprises and to lower the risks involved.

In this discussion the author is chiefly concerned with the problems present in the field of metal mining, the most common being the direct location of sulphide orebodies by virtue of their generally high electrical conductivity. In addition to the direct location of mineralized zones the problems of structural geology, knowledge of which is necessary for the indirect location of mineralized zones, are examined.--W. Ayvazoglou.

(831) WHAT LIES FIVE MILES UNDER SEA?

By Miller James

The Washington Post, Sunday, April 3, 1932, pp. 7 and 13.

The author describes in this article the organization of an expedition which started recently for the West Indies to explore on a large scale the bottom of the ocean. The purpose of the expedition, which is equipped with the most modern apparatus, is to throw new light on the shape of the earth, as well as on the cause of earthquakes.

A newer type of submarine is used, which probably will make possible more satisfactory experiments some 60 to 80 feet below the surface of the sea with Dr. Meinesz' new gravity measuring device.

Prof. Field, who is in charge of the expedition, explained that the region of the Bahamas was selected as the base of operations for the cruise because this section of the world affords a special opportunity for testing conflicting theories on the building up of great mountain ranges, as well as the probable cause of earthquakes and volcanoes.

A brief explanation on how the exact depth of the ocean's floor at any given point can be measured by means of a "fathometer" is given--W. Ayvazoglou.

(832) THE COMPOSITION OF THE INTERIOR OF THE EARTH

By A. A. Bless

Proceedings of the National Academy of Sciences, Washington, D. C., vol. 17, No. 4, 1931, pp. 225-229.

The object of this paper is to present a theory explaining the high ensity of the interior of the earth on the basis of the ionization of the lements composing the core, as, according to the author, the iron core heory can not be considered to be very plausible; the composition of the arth must be assumed to be no different from that shown by other celestial odies. The author concludes: "The paper here presented has for its aim ot a dogmatic explanation of the density of the earth, but rather is it an ffort to call attention to a new, probably more satisfactory method of ttack of the problem."--W. Ayvazoglou.

(833) GEOPHYSICAL STUDIES IN ITALY

By A. Belluigi

Petroleum World, New York, vol. 3, No. 1, 1932, pp. 16-17.

The importance of a serious investigation of the zone flanking the pennines on the side toward the Adriatic is pointed out. According to in- estigations on gravimetric relief with the Eötvös balance in the region of an Colombano on the Lambro, noteworthy indications of petroleum and of ineralized water were obtained. The existence of a deep gravimetric anti- line with a gravimetric axis running from east to west immediately north of he northern edge of the hill of San Colombano was established. Besides the ork done at San Colombano, geophysical studies have disclosed the Emilian ub-Paduan dislocation which is divided by the author into three areas of pheaval: Fontevivo, Montepelato, and Cavriago.

Magnetic characteristics have been noted at the apex of the gravimetric erturbations, and electrical investigations have given useful indications. eophysical investigation of this buried Emilian dislocation has shown the ossibility of discovering petroleum at Fontevivo.--W. Ayvazoglou.

(834) AERIAL PHOTOGRAPHY IN GEOLOGICAL AND GEOPHYSICAL WORK

By Jack Logan

The Oil Weekly, Houston, vol. 64, No. 10, 1932, pp. 17-26.

Aerial surveys are at present employed on an extensive scale by both he geological and geophysical branches of the oil business. In this article ogan gives a discussion on photographic mapping in the petroleum industry nder the following headings:

1. Aiding the geologist.
2. Uses of aerial maps for geologists.
3. The aerial survey as a reconnaissance map.
4. The aerial survey as a guide map.
5. The aerial survey as a base map.
6. Making of photographs for geological study.
7. Uses of aerial surveys in geophysical work.

The aerial photographic map serves for the geophysicist working in the oil industry two principal purposes: In the first place, this map affords valuable aid in carrying out the geophysical exploration, and in the second place, the map constitutes a reliable and convenient base map for permanently recording the results of the exploration work and consequently for correlating work in different localities.

The applicability of photographic maps in connection with the torsion balance surveys and seismic investigations are examined.—W. Ayvazoglou.

8. GEOLOGY

(835) LIMITATIONS OF GROUND WATER AS AID IN DETERMINATION OF HIDDEN GEOLOGIC STRUCTURE

By E. K. Soper

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 4, pp. 335-360.

The main features of the water table are controlled by the topography. The usefulness of water-table data in searching for buried structure is limited, therefore, to those localities where the surface of the land is relatively flat--consequently, where there is no topographic clue to the underlying structure. Under such conditions, irregularities of the water table such as wide flat terraces, sharply defined artesian areas, or anticlinal bulges may be reliable indicators of the existence and location of buried structure. In making hydrographic contour maps, water levels on piezometric surfaces are sometimes erroneously included with the water-table levels, producing misleading results. Many small but prominent water-table irregularities are the result of local variation in porosity of the water-bearing material, whereas other similar irregularities are due to artificial causes such as intensive pumping of wells or extensive irrigation of some areas. There are large areas in California, on the Gulf coastal plain, and along the Atlantic coastal plain where carefully compiled ground-water data may prove helpful in determining hidden geologic structure when used with the proper limitations.—Author's abstract.

(836) STRUCTURAL AND COMMERCIAL OIL AND GAS POSSIBILITIES OF CENTRAL VALLEY REGION, CALIFORNIA

By Walter Stalder

Bulletin of the American Association of Petroleum Geologists, Houston, vol. 16, No. 4, 1932, pp. 361-371.

Relationship of the igneous core of the Marysville Buttes to the etroliferous Cretaceous rocks is presented. Lenticular sands, buttress ands, and structural terraces, or low anticlines, around a great bow in the ediments east of Kettleman Hills, afford favorable conditions for accumulaion of oil and gas. Evidence of similar general conditions north of heeler Ridge is presented and discussed.--Author's abstract.

9. NEW BOOKS

(837) Bauer, Louis A. and Fleming, John A. Annual report of the director of the Department of Terrestrial Magnetism, Carnegie Institution of Washington. Reprinted from Year Book No. 30 for the year 1930-31, pages 281 to 370, 1 plate. Issued December 10, 1931. Contents: (1) General summary, (2) investigational and experimental work: (a) Terrestrial magnetism and electricity and cosmical relations, (b) research associates and collaborators, (c) magnetism and atomic physics, (d) experimental work in terrestrial electricity, (3) field work and reductions: (a) Land magnetic survey; (b) field-operations and cooperative surveys, (c) observatory-work, (d) ocean work, (e) instrument shop, (4) Miscellaneous activities, (5) abstracts of publications and investigations, (6) bibliography of contributions, (7) personnel.

(838) Conrad, V. and Weickmann, L. Ergebnisse der Kosmischen Physik (Results of cosmic physics), Akademische Verlagsgesellschaft, m.b.H., Leipzig. Vol. 1, 448,pp., 243 figs. Price, M. 46 (for the subscribers of the Gerlands Beiträgen, M. 40.). Contents: (1) On the problems of the aurora polaris, by Carl Störmer, (2) absorption coefficient of the penetrating radiation, b W. Kolhörster and L. Tuwim, (3) the barometer effect of the penetrating radiation, by W. Kolhorster and L. Tuwim, (4) the atmospheric ozone, by F. W. Paul Götz, (5) on the propagation of explosion waves in the earth's atmosphere, (6) new ways for the determination of the figure of the earth, by F. Hopfner, (7) on the dynamic of the forms of movement on the surface of the earth, by F. M. Exner.

(839) Jones, Dr. W. R., and Cissarz, Dr. Arnold. German-English geological terminology. Issued by Thos. Murby and Co., London. 250 pp. Price 12 s. 6 d. net. Many geologists and mining engineers will welcome this volume, as it fills a want which has hitherto remained unsatisfied.

(840) Macelwane, J. B., and Sohon, F. W. Introduction to theoretical seismology Part II, Seismometry, by F. W. Sohon. 149 pp., $2.75. Publishers, John Wiley and Sons, 440 Fourth Ave., New York City. Contents: (1) Oscillatory motion, (2) the horizontal seismograph, (3) the vertical seismograph, (4) the recorder, (5) amplification, (6) friction, (7) galvanometric registration, (8) the onset of a new phase, (9) the tapping test, (10) appendix, miscellaneous graphical methods, identification of phases, Zeissig's method for determining epicenters, solution of spherical triangles, the stereographic projection, (11) tables, (12) index.

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1. GRAVITATIONAL METHODS

(841) ÜBER NORDDEUTSCHE SALZSTÖCKE, IHRE GENESIS UND TEKTONIK; BEZIEHUNGEN ZWISCHEN DER FORM UND DEM GRADIENTENBILD DER DREHWAAGENMESSUNG

(CONCERNING THE NORTH-GERMAN SALT-DOMES, THEIR GENESIS AND STRUCTURE; RELATIONS BETWEEN THE FORM AND THE GRADIENT PICTURE OBTAINED BY TORSION BALANCE MEASUREMENTS)

By Dr. Krusch

Kali, Halle (Saale), vol. 26, No. 5, 1932, pp. 51-56.

A discussion of the formation of salt domes in northern Germany is given in the first part of this article.

The importance of their discovery not only for the establishment of oil-bearing regions but also for the determination of tectonic lines and systems in the subsoil is mentioned. About 70 salt domes were discovered in north Germany.

The second part of the article deals with geophysical methods of prospecting for oil, especially with torsion balance measurements, by the interpretation of which typical forms of salt domes may be determined with a sufficient accuracy necessary for starting the boring tests. A few examples of these typical forms are examined.

From his observations carried out by torsion balance the author draws the conclusion that the gradient directions which often can not be explained must not be assigned to incidental causes, but must be completed by additional measurements until a geologically reasonable picture is obtained.--W. Ayvazogl

(842) NEW PENDULUM FOR PROSPECTING

Editorial note

The Petroleum World, London, vol. 29, No. 378, 1932, p. 92.

The attention of prospectors attracted by a device produced in the Paris Academy of Sciences, which may well prove useful in oil prospecting, is mentioned.

The apparatus, designed by M. Holweck and M. Lejay, is a new elastic pendulum for the measurement of gravity. The pendulum consists of a vertical rod about 4 inches long, terminating at its lower end in an elastic blade set in a fixed base. The elasticity of the spring is so calculated as to give an oscillation duration of about one second. The measurement, with an approximation of 1/10 second of the duration of about 1,000 oscillations, records gravity with a precision of two parts in a million.

To deal with errors resulting from friction, temperature, etc., required use of distinct kinds of materials: The oscillating rod is of cast quartz, ch lengthens by less than 1/1000 of a millimeter when temperature rises by C.; the spring is made of elinvar, a metal the elasticity ratio of which lmost invariable with temperature; the pendulum is inclosed in a glass bulb led to a ferro-chrome cylinder in which there is a high vacuum. The damping scillations is thus so reduced that the amplitude, after 900 oscillations, still 33 per cent of its original value. The pendulum is observed through raction prisms and reflecting microscope. For the measurement of time, a ket chronometer with the usual double overlapping second hand is sufficient.

The process has been checked by measurements along the Paris-Corsica route back, operations in Paris after the trip giving exactly the same results as eparture.--W. Ayvazoglou.

(843) DREHWAGE-MESSUNGEN AN DER AMERIKANISCHEN GOLFKÜSTE UND IHRE GEOLOGISCHE BEDEUTUNG

(TORSION BALANCE MEASUREMENTS ON THE AMERICAN GULF COAST AND THEIR GEOLOGIC IMPORTANCE)

By Walter Kauenhowen

Zeitschrift der Deutschen Geologischen Gesellschaft, Berlin,
vol. 83, No. 10, 1931, p. 731.

Below is given a translation of Kauenhowen's abstract from a paper pre-ted at the meeting of the German Geologic Society held in November, 1931, cerning torsion balance measurements carried out under the direction of the hor from 1928 to 1931 in the southern States of the United States:

Schweydar's torsion balances with photographic registration were used for measurements. The instruments answered entirely the requirements of field ice with regard to their sensitivity and construction. The execution and nization of the work was explained and illustrated by photographs; the re-s of the investigations of a series of various tectonic disturbances were ussed.

The following examples were illustrated by gravity pictures and geological files: Synclines, anticlines, soles, faults, grabens, salt domes, and atic intrusions. Among other results the southern boundary of the East s oil field, the largest in the world at the present time, was determined by imetrical method. The influence of these various disturbances upon the ient, curvature value, and isograms was explained and the importance of the lts of measurements for the oil geology was stressed.--W. Ayvazoglou.

(844) RELATIVE SCHWEREMESSUNGEN IN ERDÖLGEBIETEN

(RELATIVE GRAVITY MEASUREMENTS IN OIL-BEARING REGIONS)

By H. Gornik

Zeitschrift der Deutschen Geologischen Gesellschaft, Berlin,
vol. 83, No. 9, 1931, p. 666.

A lecture on the relative gravity measurements in oil-bearing regions was delivered by Gornik before the German Geological Society in September, 1931.

The following questions were discussed: The difference in importance for practical geologic purposes of gradient measurements carried out by the torsion balance on the one hand, and of determinations of relative gravity values carried out by the Sterneck pendulum on the other hand.

The principle of pendulum measurements and the simplified formula for the difference of the gravity values at two different stations. The necessary reductions of values determined by measurements. The importance of the reductions as based on examples from the practice. Results of pendulum measurement carried out in various regions in Germany (106 stations, 6,300 square kilometers), Egypt (12 stations, 200 square kilometers), Oklahoma (392 stations, 11,000 square kilometers), and Texas (89 stations, 40,000 square kilometers). Description of the original Sterneck apparatus and of an apparatus with photographic registration and wireless connection between the central station and field station as developed during the last years.

The importance for the German oil industry of pendulum measurements for the determination of the tectonic large structures of the north German lowland and of the structures between the salt domes. Review of pendulum stations in the whole world since 1808, about 4,800 stations in total, 600 of which belong to the Seismos Co., Hannover, and are situated in the oil-bearing regions.--Author's abstract translated by W. Ayvazoglou.

(845) ON THE STRESSES IN THE EARTH'S CRUST REQUIRED TO SUPPORT SURFACE INEQUALITIES

By Harold Jeffreys

Monthly Notices of the Royal Astronomical Society, London, Geophysical
Supplement, vol. 3, No. 1, January, 1932, pp. 30-41.

The maximum stress difference found in Darwin's problem below a surface elevation of the form $a \cos kx$, was $0.736\ g\delta a$, where δ is the density of the uppermost rocks. It has been found that if there is no restriction on the vertical distribution of strength, it is possible to support a similar elevation with stress differences nowhere exceeding about $0.68\ g\delta a$. The stress fferences are distributed through a greater range of depth than on Darwin's eory, and attain their maximum at three different places, one of which is the outer surface below the greatest elevations and depressions. This kes it possible to understand how fractures can extend up to the free surce, where, on Darwin's theory, there is no stress difference.

The stresses in a crust of variable thickness, resting on a denser terial devoid of strength, are also considered. The stress difference in the ust can in these conditions be made nowhere greater than $g\rho a$, but such a stribution can not be improved. It requires that the mass per unit area wn to a given surface in the lower layer, parallel with the spheroid (not e geoid) shall be constant, and is therefore consistent with Airy-Heiskanen ostasy. There is a disturbance of gravity in the lower layer, so that the uipotentials immediately below the interface are not strictly spheroidal. e support of inequalities in any other conditions will require greater stress fferences in the lithosphere. In the most favorable case there is no rtical stress across vertical planes, so that the crust may be considered as made of blocks floating independently.

It appears that minimum estimates of strength already made from the ight of visible inequalities and the variation of gravity at geoid level are ill approximately correct.

The elastic stresses in a floating crust due to disturbance of the outer rface by denudation or deposition over areas much wider than the depth of e crust are known to be much greater than $g\rho$ times the additional elevation depression. The development of such features will take place in three ages. In the first, so long as the disturbance is not too great, the stress fferences in the asthenosphere will not exceed its strength, and Darwin's eory, or the modifications referred to in this article, will apply. In the cond the disturbance becomes great enough to produce yield in the asthenospher l the stress differences in the lithosphere are accordingly increased to those propriate to elastic yield in a floating crust. In the third the stress fferences in the crust itself come to exceed its strength, and yield in the ust keeps pace with deposition or denudation, so that $g\rho a$ never exceeds the rength of the material.--Author's abstract.

(846) THE HYPOTHESIS OF ISOSTASY

By J. de Graaf Hunter

Monthly Notices of the Royal Astronomical Society, London, Geophysical
Supplement, vol. 3, No. 1, January, 1932, pp. 42-51.

The following conclusions regarding the Hayford hypothesis of isostasy drawn from the article:

1. The Himalayan regions so far explored gravitationally exhibit gravity anomalies which are greatly reduced by the hypothesis, and indicate an averag of 90 per cent compensation. The average departure from Hayford compensation may be represented by an equivalent stratum 864 feet thick of ordinary surfac rock (density 2.67) in excess.

This is strong support for the hypothesis of mountain compensation in accordance with Pratt and Hayford.

2. (a) Strong support for Hayford's hypothesis has been found in the United States over an area 0.9 per cent of the surface of the globe.

(b) Large departures from Hayford's hypothesis, numerically equivalen to over 1,000 feet of surface rock, have been found to characterize continenta India, over an area of 0.5 per cent of the surface of the globe.

(c) Very large departures from Hayford's hypothesis have been found in the vicinity of the Dutch East Indies. A large systematic negative anomal exists over an area of 0.25 per cent of the surface of the globe. The magnitu of this anomaly appears to average at least 0.100 cm. sec.^{2}, and is equivalen to a thickness of 2,980 -- say 3,000 feet of rock of density 2.67.

The areas dealt with are small considered as percentages of the earth's surface; they represent, however, most of the available evidence. They show that:

0.9 per cent of the surface strongly supports Hayford's hypothesis.
0.75 per cent of the surface strongly denies the hypothesis.

The fair conclusion seems to be that regions exist where the hypothesis closely resembles facts, but that regions also exist where precisely the reverse is the case. With less than 2 per cent of the earth's surface gravitationally explored, it is useless to conjecture what proportion of the earth accords with the hypothesis. There is no "principle of isostasy" in the sens that has often been implied, that is, of Hayford compensation; and it is misleading to use this term. We can not presume that Hayford compensation has actuality in any region unless we find by measurement that it has. We certai ly can not compute the form of the geoid by assuming Hayford compensation, with any chance of success.

On the other hand, we can use the concept of Hayford compensation as an ideal standard, with reference to which gravity anomalies may be stated. In doing we gain distinct computational advantages. Our anomalies will thereby very probably be freed of the disturbing effects of mountain ranges, etc., at great and medium distances; and even if on occasion this is not the case, no harm is done. We shall know what our standard of reference is, as this is quite definitely defined, just as the size and location of our reference spheroid is defined.

There may well be a "principle of isostasy" in the vaguer sense in which
ton introduced the word isostasy. I think this could almost be expressed
changing the old expression "water finds its own level" into "the earth's
ist finds its own level." Surely it is merely a mechanical concept that the
ural tendency of the material of the crust is to adjust itself toward hydro-
namical equilibrium, to which it may approximate more and more with lapse of
ne, but which it will never absolutely attain owing to the resistive strength
the materials of the crust. One would, indeed, be surprised if the ordinary
vs of mechanics and of strength of materials were suspended in the earth's
ist.

But it is the artificial, though useful, and restricted sense of Hayford
mpensation, in which the compensating densities are for convenience arranged
vertical columns of uniform density anomaly, that the term "isostasy" has
ne to mean, and the "principle of isostasy" accordingly implies the existence
Hayford isostasy over the whole earth -- which is in opposition to the ob-
rved facts.--Author's abstract.

(847) NOUVEAU MODÈLE DE PENDULE HOLWECK-LEJAY. VALEUR DE LA GRAVITÉ EN QUELQUES POINTS DE LA FRANCE CONTINENTALE ET EN CORSE

(A NEW MODEL OF HOLWECK-LEJAY PENDULUM. GRAVITY VALUES AT SEVERAL PLACES IN FRANCE AND IN CORSICA)

By F. Holweck

Comptes Rendus de l'Académie des Sciences, Paris, vol. 193,
No. 26, 1932, pp. 1399-1401.

Improvements made in the new model of the Holweck-Lejay pendulum by which
sensitivity was greatly increased are enumerated. Two series of six
surements each were made in the observatory in Paris in order to prove the
sitivity of the new apparatus. Besides, field measurements were carried
in August and September, 1931, with the same purpose. A table showing the
ues of "G" observed at a series of stations between Paris and Corsica is
en. After returning to Paris the first measurement taken in Paris before
departure was checked and in both cases the same value was obtained.--
Ayvazoglou.

2. MAGNETIC METHODS

848) ON THE DETERMINATION OF THE HORIZONTAL COMPONENT OF THE EARTH'S MAGNETIC FIELD BY A COUPLED OSCILLATIONS METHOD

By L. G. Vedy

Proceedings of the Cambridge Philosophical Society, vol. 28,
Part 1, 1932, pp. 109-114.

An account is given of a simple experiment designed to illustrate quantitatively the phenomena of coupled oscillations. Two similar small magnets are suspended in the earth's magnetic field at a suitable distance apart so that there is appreciable magnetic interaction between the two oscillatory systems. Under the conditions employed, the equations of motion reduce to a simple form and the experiment may be used as a method of measuring the intensity of the horizontal component of the earth's magnetic field.--Author's abstract.

(849) ÜBER MAGNETISCHE STÖRUNGEN DIE AN SÜDNORWEGISCHEN NORDLICHTTAGEN IN POTSDAM BEOBACHTET WURDEN

(ON MAGNETIC DISTURBANCES WHICH WERE OBSERVED IN POTSDAM DURING THE AURORA BOREALIS DAYS IN SOUTH NORWAY)

By A. Röstad

Geophysical Publication, Oslo, vol. 9, No. 3, 1931, 30 pp.

In this paper the author presents the results of a statistical study of magnetic disturbances. The work is divided into two parts: (a) Relation between the aurora and magnetic disturbances, and (b) special characteristics of magnetic disturbances.

The auroral data consisted of measurements of the angle Θ published by Störmer for auroral observation in southern Norway during 1911-22, Θ being the angle between the earth's magnetic axis and some prominent point in the aurora as seen from the center of the earth. The magnetic disturbing forces were computed from the records of Potsdam and Tucson. The curves representing the relation between Θ and the intensity of magnetic disturbance show naturally an increase in Θ with increase in magnetic activity, but for Potsdam the curve i rectilinear whatever the type of aurora (rays, arcs, or diffused arcs), while for Tucson the curve is of a parabolic type. The author believes that this was to be expected from theoretical considerations.

For the study of special characteristics of magnetic disturbances, hourly values of the disturbing force P were computed for 144 disturbed days between 1891 and 1922. The force P is referred to three rectangular axes with origin at the point of observation, one axis being parallel to the earth's magnetic axis, the second perpendicular to the magnetic axis, and the third perpendicul the other two. The components of P along these axes are respectively P_a, ., and P_c. The 144 disturbed days are divided into seven groups according intensity of disturbance. With these data a variety of investigations are rried out: Namely, diurnal-variation curves of P are developed for different tensity groups, also diurnal-variation curves of P_a/P, P_r/P, and P_c/P, agrams showing momentary frequency distributions of direction of disturbing rce, diagrams showing diurnal variations of the projections of the angle s^{-1} P_a/P (θ and ψ) on the two vertical coordinate planes, curves representg the relation between θ and P_a, and finally curves resulting from a study of regular short-period fluctuations. The author contributes a full and intersting discussion of the diagrams, pointing out their noteworthy features and tempting to discover their physical meanings.--W. F. Wallis' abstract reinted from the Terrestrial Magnetism and Atmospheric Electricity, Baltimore, l. 37, No. 1, 1932, p. 92.

(850) ERGEBNISSE REGIONAL-MAGNETISCHER FORSCHUNG IN DER EIFEL

(RESULTS OF THE REGIONAL MAGNETIC INVESTIGATIONS IN THE EIFEL)

By H. Reich

Zeitschrift der Deutschen Geologischen Gesellschaft, Berlin,
vol. 83, No. 9, 1931, pp. 646-653.

Measurements carried out at the first-class stations had shown unusually eat change in the difference of the vertical intensity between Potsdam and e Rhineland. The isodynamic lines of the vertical intensity suffered great rpings during the last 30 years which probably were caused by deep magnetic ocesses.

The regional surveys in the region of the Neuwieder basin resulted in nding positive anomalies in SSW-NNE direction in the western part of the sin; these anomalies followed about the axis of the Siegen layers. The st parts of the Eifel Valley and the southeast parts of the region of the nsrück slates were marked by negative anomalies.

An unusually strong magnetic disturbance was established in the Hohen nn in the region to the west and north of Monschau. The form and extension this anomaly makes it possible to draw a conclusion that this anomaly is obably caused by the influence of a magnetic edge-face of Plutonic granite ammersdorf-granite).--Author's abstract translated by W. Ayvazoglou.

(851) ERGEBNISSE ERDMAGNETISCHER UNTERSUCHUNGEN IM VULKANGEBIET DES LAACHER SEES IN DER EIFEL

(RESULTS OF EARTHMAGNETIC INVESTIGATIONS IN THE VOLCANIC REGION OF LAKE LAACH IN THE EIFEL)

By W. Ahrens

Zeitschrift der Deutschen Geologischen Gesellschaft, Berlin,
vol. 83, No. 9, 1931, p. 667.

The purpose of these measurements consisted of determining the distribuon of the basaltic lava streams, the extension of which below the thick overburden of trachytic tuffs could not be established in other ways. It was proved that this was possible even in the region with the most thick tuff overburden (more than 30 meters). Difficulties in following the direction of the lava streams were probably caused by the interruption of the streams; the explanation of these interruptions was possible only in single cases. On the other hand, some peculiarities in the structure of the streams could be disclosed by diagrams. Extraordinary strong anomalies were produced by basaltic slag masses, that is, by volcanic matter (Vulkanbauten) from which the lava streams originated; these anomalies were greater than those above the lava streams (sometimes to 6,000 γ).

Besides, it was established, to the contrary of measurements made in other regions (for example, schalstein in the Lahn-Dill region), that some tuffs, basaltic as well as trachytic, as long as they contain sufficient amounts of magnetic iron and are of corresponding magnitude, produce very great disturbance values, sometimes of about 1,000 γ, in places where the rocks appeared in the form of mountain tops.--Author's abstract translated by W. Ayvazoglou.

(852) INTERPRÈTATION GÉOLOGIQUE DE MESURES MAGNÉTIQUES DANS LE BASSIN DE PARIS

(GEOLOGICAL INTERPRETATION OF MAGNETIC MEASUREMENTS IN THE BASIN OF PARIS)

By J. P. Rothé

Comptes Rendus de l'Académie des Sciences, Paris, vol. 191, No. 23, 1930, pp. 1144-1146.

The purpose of the work carried out by Rothé consisted of showing how an anticline perfectly determined by geological survey can be interpreted magnetically. Two places were investigated.

1. The anticline of Bray County. Isolines were drawn based on profiles obtained from magnetic survey. According to the interpretation of the results it was shown that the presence of the geologic anomaly could be proved only in places where ferruginous sands and sandstones were outcropping. The magnetic anomaly disappeared with the disappearance of these guiding deposits.

2. Magnetic anomaly in the basin of Paris. Numerous measurements with the vertical variometer were carried out by the author in the region of Rambouillet-Houdan in order to determine exactly the form of the anomaly discussed and studied by Moureaux. According to the results the values of the anomaly obtained were smaller than those given by Moureaux. In comparing the results of magnetic surveys carried out in 1896-1904 and in 1924 the differences could not be assigned to hazard, as the region where the decrease was the highest was just that with the maximum anomaly.

Based on the results obtained it was shown that there was no relationship between the anomaly and the folds of the overburden in the basin of Paris.--W. Ayvazoglou.

(853) BERÄKNING AV MAGNETISKA MALMERS DJUPGÅENDE

(CALCULATION OF THE DEPTH OF FERROMAGNETIC ORES)

By Th. Dahlblom

Jernkontorets Annaler, Stockholm, vol. 115, No. 2, 1931, pp. 95-102.

One of the poles of an ore magnet appears always to be situated close to e deepest point of the orebody, irrespective of the relation of dip and rike to the magnetic field of the earth. If the position of the lower pole n be determined, the approximate depth of the ore is consequently known. At sufficient distance from the ore, the magnetic field may be considered to be proximately equal to that of an ideal magnet, and the author describes veral methods by which the poles of the ore magnet may be found through mea- ring the direction of the field at different points on the surface. The st results are obtained by using curves drawn through points where the angle tween the direction of the magnetic field and the axis of the magnet has the me value.--Author's abstract.

3. SEISMIC METHODS

(854) CONSTRUCTION OF MASTER MECHANICAL OSCILLATOR FOR TESTING SEISMIC RECORDERS AND OTHER ALLIED APPARATUS

By F. W. Lee and G. A. Irland

U. S. Department of Commerce, Bureau of Mines, Washington, D. C., Technical Paper 518, 1932, 17 pp.

Contents of the article:

1. Introduction.
2. Acknowledgments.
3. Specifications.
4. Scale of measurement.
5. Construction.
6. Principle of operation.
7. Electrical measurement of vibrational displacement.
8. Oscillator recorder.
9. Materials for constructing oscillator recorder.
10. Optical measuring system.
11. Method of manipulation.
12. Measurement of constants of vibrator.
13. Measurement of constants.
14. Tabulation of constants of master vibrator.
15. Discussion and results.
Appendix. Elementary mathematical relations controlling vibration of table.

Fifteen illustrations are added to the article.

The article contains investigations carried out by the authors for studying mechanical vibrations from the viewpoint of seismic exploration as well as from the limit of strength a structure may offer to blasting operations.

The necessity to have available a suitable master oscillator or vibrator with which to calibrate the field apparatus is dictated by the fact that seismograms, before they can be used to contribute real information concerning geophysics and the nature of vibrations, should be expressed in some absolute system of measurement. Records of different instruments at different stations should be directly comparable. It is therefore necessary to recheck or calibrate at various intervals these instruments to ascertain if they have retained their accuracy of calibration.

Concluding the last item "Discussion and results," the authors say:

> Mechanical systems free from linkages having vibrational rigidity are especially well suited for mathematical analysis of this nature. That building structures, units, etc., should fall into this class is purely coincidence. It is suggested that the c.g.s. system, on account of its intrinsic simplicity, be adopted in describing these relations and that the mechanical definitions which arise have a nomenclature similar to that used at present in the electrical science.
>
> From the relation
>
> $$A = \frac{\frac{F}{\omega}}{\frac{K}{\omega} - M\omega + jr} = \frac{\text{Force per unit angular velocity}}{\frac{K}{\omega} - M\omega + jr}$$
>
> the system may be reduced to one of linear fractional transformation of the straight line $\frac{K}{\omega} - M\omega + jr$ into a circle having a diameter $\frac{1}{r}$, allowing a simple graphical visualization of the amplitudes and phase relationship, the variable parameter being the angular velocity of frequency when the factor $\frac{F}{\omega}$ is held constant.--W. Ayyvazoglou.

(855) A SMOOTHING DEVICE APPLIED TO THE NEW SEISMOLOGICAL TABLES

By L. J. Comrie and Harold Jeffreys

Monthly Notices of the Royal Astronomical Society, London, Geophysical Supplement, vol. 3, No. 1, January, 1932, pp. 10-13.

The revised tables of transmission times of P and S, recently given by Jeffreys (Geophys. Abs. 32, p. 313), were provisional in the sense that there was some outstanding uncertainty about their behavior near 20°; this uncertainty has been considerably reduced (Geophys. Abs. 36, p. 420) by showing that the formulas used up to 17.5° required to have their cube terms doubled. Beyond 20° the times were empirical, except that small corrections had been plied at a few distances to satisfy the theoretical condition that the cond differences must always be negative. But there were still irregular- ies outstanding, and there was a doubt as to the mode of transition between ° and 30°. Attempts have been made to remove these, but have been given up account of the danger of introducing systematic error. A method of smooth- g devised during the preparation of the tables for interpolation appears to move these difficulties. It rests on the principle that the second differ- ces are to vary as smoothly as possible.

This device has been applied in the present paper. The method is ex- bited in two tables. The final results are shown in a table.

The authors conclude, however, "That if there are real differences be- een different earthquakes these will have been hidden by the process of eraging. Systematic differences of the order of 5s may be expected between e travel times of continental and oceanic earthquakes, on account of the fference in the structure of the upper layers. The detection and elucida- on of these must await further enquiry."--W. Ayvazoglou.

(856) THE DETERMINATION OF THICKNESSES OF THE CONTINENTAL LAYERS FROM THE TRAVEL TIMES OF SEISMIC WAVES

By A. W. Lee

Monthly Notices of the Royal Astronomical Society, London, Geophysical
Supplement, vol. 3, No. 1, January, 1932, pp. 10-13.

A novel method is given for analysis of the connection between time of igin of an earthquake, the depth of focus, apparent times of starting of e seismic waves, and the thicknesses of the layers through which they travel.

Application of the method to the available data for an earthquake near otski, Yugoslavia, on 1923 March 15, shows that the focus was near the bottom the granitic layer. The approximate thicknesses of the layers are determined 1 kilometer of sedimentary material, 11.5 kilometers of granite, and be- een 22 and 33 kilometers of intermediate rock.

The travel times of the waves from the shocks in Jersey on July 30, 1926, d in Herefordshire on August 15, 1926, indicate that the thicknesses of the anitic and basaltic layers were 14 and 15 kilometers, and that the foci were and 6 kilometers respectively below the top of the granite.--Author's stract.

(857) THE NORTH SEA EARTHQUAKE OF 1927, JANUARY 24

By A. W. Lee

Monthly Notices of the Royal Astronomical Society, London, Geophysical Supplement, vol. 3, No. 1, January, 1932, pp. 21-30.

Contents:

1. Introduction.
2. Data.
3. Determination of epicenter.
4. The normal P and S waves.
5. Other waves.
6. Depth of focus and time of origin.

Author's summary reads as follows:

Data given in the International Seismological Summary for the North Sea earthquake of January 24, 1927, have been supplemented by measurements of the original seismograms for Dyce, Edinburgh, Stonyhurst, Copenhagen and Kew, for determination of the epicenter and study of the phases recorded. The epicenter is located as 59°.4 N., 2°.9 E., with time of origin $5^h\ 18^m\ 11^s$.

Times of transmission for the P and S phases may be represented closely by the formulas:

$$T_p = 5^h\ 18^m\ 22^s + 14.21\Delta - 2.00\ (\Delta/10)^3$$
$$T_s = 5^h\ 18^m\ 17^s + 25.50\Delta - 3.50\ (\Delta/10)^3$$

A number of measurements indicate other waves with velocities 7.0 km./sec. (P_Q) 4.0 km./sec. (S_Q) and 3.6 km./sec. (S^*).

The focus was situated near the bottom of the granitic layer.--W. Ayvazoglou.

(858) OUR PRESENT KNOWLEDGE CONCERNING THE INTERIOR OF THE EARTH

By James B. Macelwane

Bulletin of the Seismological Society of America, Stanford University, Calif., vol. 21, No. 4, 1931, pp. 243-250.

This paper was presented at a meeting of the Eastern Section of the Seismological Society of America, June 11 and 12, 1931. The author started the discussion on the structure of the earth with Mohorovicic's account of the Kulpa Valley earthquake of October 8, 1909, in southern Europe, in which the latter found it necessary to postulate two layers in the structure of the earth's crust in order to account for the successive impulses he observed in the first phase. The discussion on the development of the knowledge concerning the interior of the earth was then continued based on the extensive literature published on this question. A list of references mentioned by the author during the discussion is added to the article.--W. Ayvazoglou.

(859) FILLING THE GAPS IN THE SEISMOLOGICAL PROGRAM

By N. H. Heck

Bulletin of the Seismological Society of America, Stanford University,
Calif., vol. 21, No. 4, 1931, pp. 261-267.

In the first part of this article Heck enumerates the seismological ations installed in the Caribbean region as a whole and says that although l these stations are important in connection with the study of this region is necessary that other high-grade stations be added either by the replace- ent of instruments at existing stations or by the establishment of new ones.

The main part of this article deals with the seismological problems of e continental United States. In examining the instrumental situation the thor points out a number of important gaps yet to be filled.

Some problems to be solved are discussed, such as: The number of stations equired, types of instruments to be selected, need for a limited number of ertical-component seismometers at selected stations, the very serious question providing the stations with trained personnel, developing entirely new types instruments, etc.

The author concludes that although we may feel greatly encouraged at the rogress that has been made, a determined effort must be made to fill the gaps the program that have been described, as well as others that may exist or at may develop.--W. Ayvazoglou.

(860) MODIFIED MERCALLI INTENSITY SCALE OF 1931

By Harry O. Wood and Frank Neumann

Bulletin of the Seismological Society of America, Stanford University,
Calif., vol. 21, No. 4, 1932, pp. 277-283.

The formation of a satisfactory earthquake intensity scale has long been subject for consideration and discussion among those who are interested tively in studies of shock intensity and its geographic manifestation.

The Rossi-Forel scale which has been in wide use for many years has be- ome inadequate for present-day needs.

The scale proposed here by the authors is a modification and condensation the Mercalli-Cancani scale as formulated by Sieberg (A. Sieberg, rdbebenkunde", pp. 102-104, Jena, 1923), worked out at the Seismological boratory in Pasadena, Calif. The scale presented in this article has been ccepted, after some changes and additions, by organizations and individuals the United States active in seismological work. The U. S. Coast and eodetic Survey will use it in the publication of its seismological results r 1931.--W. Ayvazoglou.

(861) ACCURATE RECORDS OF STRONG EARTHQUAKE MOTIONS

By N. H. Heck

Bulletin of the Seismological Society of America, Stanford University,
Calif., vol. 21, No. 4, 1931, pp. 285-288.

Although a number of institutions and organizations, as well as the National Government, have included in their program the observation of distant earthquakes and of light to moderate near-earthquakes, and also the collection of reports of visible and felt effects of strong earthquakes, nothing has been done, according to the author, in the precise instrumental measurement of strong earthquake motions, especially in the cases in which damage has occurred.

In this article the author outlines a number of principles which have been developed by him through study of the problems and through conferences in order that the situation may be understood.--W. Ayvazoglou.

(862) THE P CURVE AND THE S CURVE RESULTING FROM A STUDY OF THE TANGO EARTHQUAKE, JAPAN, MARCH 7, 1927

By Ernest A. Hodgson

Bulletin of the Seismological Society of America, Stanford University,
Calif., vol. 22, No. 1, 1932, pp. 38-49.

The records of the Tango earthquake, for which the coordinates of the epicenter and the origin time are well defined and whose focus is shallow, furnish data which define the P curve with considerable precision to an epicentral distance of about 8°. From that point to 50° the curve is fixed in position by very few points. The values given by Byerly for the Montana earthquake have influenced the author in placing the curve as reported for this range. Such a placing is demanded also, to some extent, by the earlier and the later parts of the curve. As so placed, it lies considerably below the Mohorovicic-Macelwane P curve for much of the range, the maximum difference being about nine seconds. It is certain that the latter curve gives P-O intervals much too great near the center of this range, but it would be desirable to make a detailed study of some other earthquake whose epicentral position, origin time, and depth of focus could be well defined and for which the last named would be shallow, the earthquake being so situated that well-equipped stations would register the disturbance for distances within this range.

From 50° to 60° the control is better, but there are still too few points to fix its position as definitely as could be desired. From 60° to 100° there are many control points of considerable strength. This section of the P curve seems fixed in position within narrow limits. Data for distances beyond 101° are lacking.

Footnotes to the tabulations for both the P curve and the S curve are en in some detail as showing the relative strength of controlling points.

In the case of the S curve, there seems to be no well-defined departure m the curve published in mimeographed form by Macelwane in 1926. The foot-es explain outstanding departures from this curve. It may be said that the go earthquake data support the previously published S curve to within the its of accuracy of the observations.--Author's abstract.

(863) RICHMOND QUARRY BLAST OF SEPTEMBER 12, 1931, AND THE SURFACE LAYERING OF THE EARTH IN THE REGION OF BERKELEY

By Perry Byerly and Karl Dyk

Bulletin of the Seismological Society of America, Stanford University, Calif., vol. 22, No. 1, 1932, pp. 50-55.

The authors describe in this article the results of a quarry blast ried out near Castro Point, Richmond. To place the charge a horizontal ft 63 feet long, 5 feet wide, and 4 feet high was dug into the base of the -foot cliff face. At its end was driven a cross shaft, 163 feet in length, ng which the charge of 32.5 tons of 10 per cent Judson blasting powder was ced. It was estimated that 300,000 tons of rock were loosened. The result- earth shock was recorded at Berkeley on the two Wood-Anderson seismographs.

The interpretation of the records is given. The various arrivals of waves are shown in a figure. Speeds of 4.44 kilometers per second for P wave and 2.37 kilometers per second for the S wave were established. ratio of speeds for P and S is thus 1.87, which indicates that Poisson's io for this medium is 0.3. This value is not inconsistent with that given Nagaoka for sandstones. P and S also were recorded which had speeds of 5.6 3.1 respectively. These are recognized values for granite. It is there-e concluded that granitic rocks underlie this region and that these waves e penetrated into it for part of their paths.--W. Ayvazoglou.

(864) TESTING OF PHOTOGRAPHIC RECORDERS

By H. E. McComb

Bulletin of the Seismological Society of America, Stanford University, Calif., vol. 22, No. 1, 1932, pp. 56-59.

The operation of the optical system used in the tests is described as lows: A straight-filament galvanometer lamp is mounted about 1 meter from face of the recording drum to be tested. The filament of the lamp is ad-ed so that it is parallel to the axis of the drum and to the axis of a t-focus cylindrical lens mounted just in front of the lamp. The light which passes through this lens is brought to focus on the face of the drum and forms an enlarged image of the lamp filament. The cylindrical lens of the recorder is then interposed in its regular position and the rays brought down to a very fine line. The light is flashed at regular intervals by means of a shutter operated by a break-circuit chronometer.

Sections of two of the records made with two different recorders are shown in two figures.--W. Ayvazoglou.

(865) DEVELOPMENT OF SEISMOLOGICAL INSTRUMENTS AT THE BUREAU OF STANDARDS

By Frank Wenner

Bulletin of the Seismological Society of America, Stanford University, Calif., vol. 22, No. 1, 1932, pp. 60-67.

In this article Wenner describes the construction of an accelerometer assigned for use within the destructive area of major earthquakes. This instrument may be adjusted to, and it is expected that it will be used with, a period of one-tenth of a second or possibly somewhat less.

A photograph of the accelerometer is given.--W. Ayvazoglou.

(866) A PORTABLE SEISMOGRAPH FOR RECORDING ARTIFICIAL EARTHQUAKES

By J. H. Jones and D. T. Jones

Journal of Scientific Instruments, London, vol. 9, No. 1, 1932, pp. 8-17.

A portable seismograph for recording artificial earthquakes is described. The motion of the pendulum is magnified by means of an arrangement of two smal magnets and a soft iron element suspended on a phosphor-bronze strip which is attached to the pendulum.

The coupling of the magnifying system to the pendulum introduces a couple which opposes the restoring moment of the pendulum and lengthens the periodic time of the seismograph. Other important features of the instrument are the absence of friction from the magnification linkage and simple methods for the remote control of the "zero," the period, and the sensitivity. An experimenta investigation of the relation between the period and sensitivity is described.

The instrument has been thoroughly tested, under difficult field conditions, by the geophysical staff of the Anglo-Persian Oil Co. (Ltd.), during seismic surveys in the oil fields of southwest Persia.

Three typical seismograms obtained with the instrument are shown.

Contents:

1. Introduction.
2. Description of the instrument: (a) The pendulum; (b) the magnetic method of magnifying the pendulum motion; (c) remote control of zero position; (d) remote control of the period and sensitivity; (e) the damping of the free movement of the element and pendulum.
3. Theoretical considerations: (a) Condition for maximum pendulum magnification; (b) effect of the size of the cone on the magnification.
4. Experimental investigation of the sensitivity and period of the seismograph: (a) The magnification of the pendulum; (b) the magnification due to the magnet system; (c) the effect of the magnet system on the period of the pendulum; (d) the effect of varying the tension of the suspension.
5. Test of seismograph in the field.--W. Ayvazoglou.

(867) SISMOGRAPHE ENREGISTREUR ASKANIA À TROIS COMPOSANTES, DESTINÉ À LA MESURE DES VIBRATIONS DES CONSTRUCTIONS

(ASKANIA THREE-COMPONENT RECORDING SEISMOGRAPH ASSIGNED FOR MEASURING THE VIBRATIONS OF BUILDINGS)

Editorial note

Le Génie Civil, Paris, vol. 100, No. 8, 1932, pp. 193-195.

The description of the Askania 3-component recording apparatus based on weydar's principle is given in this article. The apparatus constructed in laboration by Prof. Hort and Angenheister has been improved by Askania Works ch reduced the defects of its construction to a minimum by introducing ical transmission and amplification of oscillations, as well as by proper ice of the relation between the levers and the dimensions of the oscillating tems. A longitudinal section of the seismograph and diagrams recorded on a sel motor are added.--W. Ayvazoglou.

(868) ÜBER OBERFLÄCHENWELLEN

(CONCERNING SURFACE WAVES)

By Tokunosuke Itoo

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 3/4, 1932, pp. 349-356.

Mathematical discussion on the surface waves is given under the following dings:

1. Fundamental equations concerning surface waves.
2. Surface shearing waves.
3. Relationship between the absorption coefficients and viscoelastic coefficients.--W. Ayvazoglou.

4. ELECTRICAL METHODS

(869) ÜBER EIN GEOLEKTRISCHES SCHÜRFVERFAHREN ZUR INDIREKTEN BESTIMMUNG DER DECKEN- UND FLOZMACHTIGKEIT

(ON A GEOELECTRICAL METHOD OF PROSPECTING FOR DETERMINING THE THICKNESS OF THE OVERBURDEN AND THE THICKNESS OF THE LAYER)

By W. Stern

Braunkohle, Halle (Saale), vol. 31, No. 9, 1932, pp. 149-152.

In this article the author gives a description of the physical foundations of a geoelectrical method of prospection, its operation and the apparatus used. The description is based on the results of the practical application of the method carried out during 1930 and 1931 in the lignite mines "Gruhlwerk and Beisselsgrube" of the "Rheinische Aktien-Gesellschaft für Braunkohlenbergbau und Brikettfabrikation."

The apparatus, a diagram showing schematically the method of connection used for measurements, as well as two resistance diagrams based on which the depth-profiles of the Gruhlwerk mine and Beissel mine were determined are given.--W. Ayvazoglou.

(870) EIN NEUER SCHULZESCHER ERDINDUKTOR

(A NEW SCHULZE'S EARTH INDUCTOR)

By R. Bock

Zeitschrift für Instrumentenkunde, Berlin, vol. 52, No. 2, 1932, pp. 85-86.

The article describes a new construction of the earth inductor, as designed by Schulze's precision measuring instrument shop and the author, by which some inconveniences in determining the magnetic inclination, especially by taking field measurements, are eliminated.

A photograph of the instrument is given.--W. Ayvazoglou.

(871) ELECTRICAL CORING BY THE DETERMINATION OF BOTTOM-HOLE DATA

By C. and M. Schlumberger and E. G. Leonardon

The Petroleum Times, London, vol. 27, Nos. 688 and 689, 1932,
pp. 307-308 and 355-357.

This article is a summary of Technical Publication 462, 1932, 38 pp., sued by the American Institute of Mining and Metallurgical Engineers. An stract of Technical Publication 462 is given in Geophysical Abstracts 35, 392.--W. Ayvazoglou.

(872) ELECTRICAL CORING: DETERMINING BOTTOM-HOLE DATA BY ELECTRICAL MEASUREMENTS

By C. and M. Schlumberger and E. G. Leonardon

The Petroleum World, London, vol. 29, Nos. 378 and 379, 1932,
pp. 98-100 and 122-124.

This is an article published by the authors from a paper presented before e American Institute of Mining and Metallurgical Engineers in New York and sued as Technical Publication 462 in 1932. Authors' abstract of this publi- tion is given in Geophysical Abstracts 35, p. 392.--W. Ayvazoglou.

(873) INSTRUMENT FOR MEASURING CORROSIVE PROPERTIES OF SOIL

By E. R. Shepard

The Oil Weekly, Houston, vol. 61, No. 11, 1931, p. 30.

As a result of the study of corrosion of underground pipes it was found at soils high in soluble salts, and therefore low in electrical resistivity, e usually highly corrosive to pipe lines. In this connection, Shepard veloped an instrument for a simple and quick measurement of the electrical sistivity of soil.

In this article the description of the Shepard earth-resistivity meter given. The meter consists mainly of two rods or canes tipped with iron ectrodes; a flashlight battery and milliammeter are mounted in a light uminum frame on one of the rods. The rods are pushed into the earth with a paration of about 1 foot or more, the circuit is closed, and the resistivity the soil is read directly in ohm-centimeters on the scale of the instrument. e manner in which polarization has been overcome or minimized has been complished by making the cathode very much larger than the anode, as shown in e accompanying figure.--W. Ayvazoglou.

(874) DRILLING PROVES EXISTENCE OF METEORIC MASS

By C. H. Wilson

The Mining Journal, Phoenix, vol. 15, No. 23, 1932, p. 7.

A brief account of the geophysical examination of Meteor Crator and the results obtained was published by the Mining Journal of April 15, 1931 (see Geophys. Abs. 25, p. 127). In the present article information is given on the results of two drill holes completed by the Meteor Crator Exploration & Mining Co.

The existence of a mass of meteoric material at the depth and location indicated by the previous geophysical examination of the crater was proved.-- W. Ayvazoglou.

5. RADIOACTIVE METHODS

(875) ZUM PROBLEM DER RANDSTÖRUNGEN BEI IONENMESSUNGEN

(CONCERNING THE PROBLEM OF EDGE-DISTURBANCES IN CARRYING OUT IRON MEASUREMENTS)

By H. Israel

Gerlands Beiträge zur Geophysik, Leipzig, vol. 35, No. 3/4, 1932, pp. 341-348.

Measurements of ions carried out according to the condenser method result in errors caused by the inhomogeneity of the electrical field at the ends of the condenser. These errors may be calculated if they are supposed to be caused by an hypothetical condenser with homogeneous field, joining directly the condenser. The "methods of charging and discharging" (Auflade-und Entlademethode) give different disturbances, the hypothetical condenser will also be different in both cases. Two constants of the disturbances a and i are given, allowing a correction of the measured number of ions and of their mobility for both methods; their reciprocal value represents a direct measurement of the magnitude of the disturbance. It is shown that the method of discharging is preferable for counting the ions, and the method of charging for measuring the mobility.--Author's abstract.

(876) DIE ELEKTRISCHEN ZÄHLER FÜR KORPUSKULARSTRAHLEN

(ELECTRIC COUNTERS FOR CORPUSCULAR RAYS)

By Georg Stetter

Verhandlungen der Deutschen Physikalischen Gesellschaft,
vol. 12, No. 2, 1931, pp. 26-29.

In a lecture delivered at the meeting of the Austria association in nna held on June 8, 1931, the author discussed the methods of counting the puscular rays (Duantenelektrometer, Röhrenelektrometer and Stossionisations-ler). Principles of operation and the limits of the effects produced by h instrument were compared.--W. Ayvazoglou.

6. GEOTHERMAL METHODS

(877) RELATION OF EARTH TEMPERATURES TO GEOLOGIC STRUCTURE

By John A. McCutchin

The Oil Weekly, Houston, vol. 65, No. 2, 1932, pp. 21-26.

The purpose of this research has been to determine the possibility of ng temperature data for the location of future oil pools, particularly in as where the generally used geological and geophysical methods meet with tle success.

Detailed temperature surveys have been made by the author in over 300 ls located in 40 oil fields of Oklahoma and Kansas. While the relations any field in these areas are practically the same, the relations of earth peratures to geologic structure in the Dilworth field of Kay County, Okla., been chosen to illustrate the possibilities of using earth temperatures to ate oil fields. A brief history of the study of earth temperatures and a cription of method and apparatus are given. According to two parts of a te added to the article, a marked relation between geologic structure and present observed position of the isothermal surfaces in the south dome the Dilworth field is shown.

The author concludes: "The results of the temperature observations made the Dilworth field and in many other fields of Oklahoma and Kansas indicate t this problem has commercial possibilities as a new geophysical method of ating buried structure. It is to be remembered, however, that all these ob-vations have been made in proved fields and abandoned wells and until the hod has been tried in a new area, either by making temperature observations core drill holes or drilling wells, it will remain as a possibility and not a proved fact."--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(878) CHOICE OF GEOPHYSICAL METHODS IN OIL PROSPECTING

By E. Degolyer

The Petroleum Times, London, vol. 27, No. 694, 1932, pp. 493-494.

The four methods developed, in the author's opinion, to the point of having any claim to practicability in oil prospecting are: The magnetic, gravimetric, electrical, and seismic methods.

Concerning the choise of the method, the author's opinion is that in the present state of development of the geophysical methods for areas where the occurrence of oil pools is controlled by normal folding, the results obtained from seismic surveys, reflection method, are more definite and of greater valu than any other type of geophysical information available. A survey of this type is regarded better than any results secured by other methods.

The second choice for all areas, and first choice for areas in which the seismic methods are not usable, would be the gravimetric method.--W. Ayvazoglo

(879) THE SEARCH FOR OIL IN AUSTRALIA AND DR. WOOLNOUGH'S REPORT

By Frederick G. Clapp

The Petroleum World, London, vol. 29, No. 378, 1932, pp. 75-76.

In this article Clapp gives some remarks on the document entitled "Report on tour of inspection of the oil fields of the United States of America and Argentina, and on oil prospects in Australia," by W. G. Woolnough, geological adviser to the Commonwealth Government (see Geophys. Abs. 37).

Regarding geophysics, to which, according to Clapp, Woolnough pays but a small measure of attention, probably for the reason that the subject is a dangerous one for public consumption, and because more highly technical knowl is needed for its comprehension than with regard to perhaps any branch of the subject he covers, Clapp, in the paragraph "Use of geophysics," points out th this science should never be used except where designated by a geologist, sho never be used broadly except in such definite areas as recommended for the pu pose, and its determinations should always be passed upon by a geologist experienced in interpretation of such data. Under proper guidance, what appear to the novice to be a meaningless array of lines, arrows and figures on a map or graph, becomes of positive value, and often enables drilling on the crest a buried structure that otherwise would remain unknown.--W. Ayvazoglou.

(880) LA PROSPECTION ET L'ORGANISATION DE LA PRODUCTION DES MINES, PARTICULIÈREMENT DANS LES COLONIES

(PROSPECTING AND ORGANIZATION OF PRODUCTION IN MINES, ESPECIALLY IN THE COLONIES)

By Ch. Berthelot

Le Génie Civil, Paris, vol. 99, Nos. 21 and 22, 1931,
pp. 522-524 and 554-556.

After a brief remark on the necessity of providing France with minerals ich can be obtained from its colonies, the author discusses in the first part this article the general methods of prospecting which may be used for this rpose. In addition to geological survey the possibility of application of ophysical methods (gravimetric, magnetic, electrical, and seismic) is exained.

The second part of the article deals with the methods of the organization production.--W. Ayvazoglou.

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(881) NEUE METEOROGRAPHEN FÜR DRAHTLOSE FERNÜBERTRAGUNG

(NEW METEOROGRAPHS FOR RADIO TRANSMISSION OF RECORDS)

By Ludwig Heck and Günther Sudeck

Gerlands Beiträge zur Geophysik, Leipzig, vol. 31, No. 1/3,
1931, pp. 291-314.

For the meteorological research of altitude, automatic transmission of the cording of the instruments from a pilot balloon is necessary. By this way e results of the recordings will reach the observer with certainty and witht delay. The measured values of air pressure, temperature, and moisture must transmitted by wireless from the pilot balloon to the ground station.

Two instruments corresponding to the requirements of weight and innsibility to cold are described. The working of both is the following: The gular deflection of the pointer is transformed by scanning with a rotating ntact in an impulse. The period of the impulse is proportional to this angle.

This impulse is radiated from a small short-wave transmitter. At the reiving station on the ground this impulse-period is retransformed in a deflecon of the recording instrument.

A simple telephotographic receiver is especially adapted as recording strument. The indications are automatically recorded and the diagrams can observed during the ascension. The two sending instruments differ from each other in the way of scanning the measured values. The one instrument works with a rotating contact, controlling the wireless transmitter directly in the plate circuit of the transmitting valve. The other instrument uses a light ray for scanning the measured values, controlling the transmitter by a selenium cell as a variable grid leak. Very light batteries insensible to cold are used.

The experiments in the laboratory, as well as with kite and balloon ascensions, will be continued. The valuation and precision of the diagrams will be published.--Authors' abstract.

(682) GEOPHYSICAL PROSPECTING

By T. H. Laby

Nature, London, vol. 129, No. 3259, 1932, p. 579.

The author, who is one of the editors of "The principles and practice of Geophysical prospecting" (see Geophys. Abs. 23, p. 214) (the other editor being A. B. Broughton Edge), publishes in this note the correction of an error which has crept into the discussion of field tests at Tallong, N. S. Wales, given on page 229 of the book:

> In fig. 176 the east and west indicators have been accidentally interchanged. The same figure indicating the interpretation placed on the geophysical work shows the existence of a mass of alluvium over a mile wide and upwards of 200 feet deep. In the geological map of the Tallong area, reproduced on page 228, no such deposit of anything approaching to this extent and thickness is shown, though the omission of a geologist to indicate such a mass of material would be very serious. As a matter of fact, the deposit is mostly decomposed granite in situ. The mistake in representing this as alluvium is obviously due to the fact that decomposed granite transmits seismic waves comparatively slowly, as would alluvium - namely, at the rate of about 3,000 feet per second. Actually there is outcropping granite over this portion of the area, as shown in the geological map. The use of the term "alluvial velocities" as a general expression for the velocity of a wave through incoherent material is apt to be misleading, and might be discontinued.
>
> In fairness to the geologists who surveyed this area years ago, it must be admitted that the geophysical interpretation, while accurately classifying the material according to the velocities of the transmitted waves, was inaccurate in its presentation of the geological structures of the Tallong area.--W. Ayvazoglou.

8. GEOLOGY

(883) VARISZISCHE ZÜGE DER SCHWEREVERTEILUNG IM GEBIRGSBAU SUDWEST-UND MITTELDEUTSCHLANDS

(VARISTIC LINES OF GRAVITY DISTRIBUTION IN THE STRUCTURE OF MOUNTAINS OF SOUTHWEST GERMANY AND CENTRAL GERMANY

By Rudolf Herrmann

Zeitschrift der Deutschen Geologischen Gesellschaft, Berlin,
vol. 83, No. 10, 1931, pp. 701-731.

Contents:

1. The problem of the latent gravity surpluses.
2. Geological position of the latent gravity surpluses.
    a. Lower Silesia and Lower Lausitz.
    b. East Harz-foreland.
    c. Kraichgau, Franken, and Lorraine.
3. Interpretation.
4. Conclusions.
    a. Gravity and structure of the varistic mountain system.
    b. Disappearance of the varistic gravity.
5. Summary of the main results.
6. Literature.

The figures added show: (1) The relation between the tectonic and gravi-tric types; (2) a tectonic map of the southeastern surroundings of the Harz;) the places of the Alpine-type gravity distribution in the varistic rocks;) the Permian eruptive rocks of the varistic underground layers represented the Wolff's quartz triangle.--W. Ayvazoglou.

(884) NOTIZEN ZUR ÖLGEOLOGIE UND SALZTEKTONIK

(NOTES CONCERNING OIL GEOLOGY AND SALT TECTONIC)

By Karl Krejci-Graf

Petroleum Zeitschrift, Berlin, vol. 27, No. 48, 1931, pp. 893-897.

The following notes concerning oil geology and salt tectonic are given by e author in this article:

1. The deepest boreholes in the world.
2. The deepest productive boreholes in the world.
3. Boreholes in the sea.
4. Apparatus for measuring the inclination of boreholes.

5. Geophysics -- the use of seismographs in boreholes for determining deep structures is mentioned. A few figures showing the number of salt domes discovered by geophysical methods of prospecting in the Gulf Coast are given.
6. Gas-oil ratio.
7. Oils which are heavier than water.
8. Gas in subrecent layers.
9. Density rule of oils.
10. Distribution of oil and water.
11. Movement of the edge water.
12. Uncommon secondary rocks.
13. Salt tectonic.--W. Ayvazoglou.

9. NEW BOOKS

(885) Alexanian, C. L. Traité pratique de prospection géophysique (Practical treatise on geophysical prospecting). For the use of geologists and minin engineers. 1932, 268 pp., 133 figs., 2 plates. Price: Fr. 62; additiona postal charges, in France, Fr. 2.50, Foreign countries, Fr. 5.50 and Fr. 8.00. Librairie Polytechnique Ch. Beranger, 15, Rue des Saints-Pères, Paris. Contents: Introduction -- general rules; Part 1: Direct procedures. Chapter I, Gravimetrical method of prospecting; II, Magnetic method; III, Electrical method (natural currents); IV, Geothermal method; V, Radioactive method; VI, Seismic method; VII, Electrical methods: (1) By measuring electrical potentials; (2) electromagnetic method; (3) by using Hertz's waves. Part 2: Application of geophysical methods of prospection and geological interpretation of the results of measurements. Chapter I, Comparative study of various methods of geophysical prospecting; II, Practical application of the torsion balance; III, Practical application of magnetic method of prospection; IV, Application of electrical method (natural currents); V, Application of geothermal method of prospecting; VI, Application of radioactive method of prospecting; VII, Application of seismic method of prospecting; VIII, Practical application of electrical methods of prospecting. This is a handbook designed to guide the operator in the field and the geologist in the interpretation of the results obtained by measurements.

(886) Berliner, A., and Scheel, K. Physikalisches Handwörterbuch (Hand-dictionary of physical terms). Julius Springer, Berlin, 1932, 2 Auflage VI and 1,428 pp., 1114 figs.; price, R. M. 96. Geophysical terms are considered.

(887) International Research Council. Third report of the Commission appointed to further the study of solar and terrestrial relationships. Percy Lund, Humphries and Co., London, 1931, V - 132 pp.
This is the third of the reports of the Commission to the International Research Council, the first two having been printed and circulated in 1926 and 1929. The report proper, covering the first three pages, deals briefly with the following topics: Publication of the second report,

nstitution of the committee, bulletins of daily character figures r solar phenomena, the proposed International Polar Year of 1932-33, daily magnetic character figures, memoranda on recent progress, d ultraviolet solar radiation. The remaining 129 pages of the blication contain 40 articles by various authors, of which the llowing may be mentioned as of especial interest: S. Chapman, Solar fluences on the Earth's magnetism and on the upper atmosphere; d'Azambuja, Sur l'observation des phénomènes éruptifs dans le romosphère solaire et leurs relations avec les orages magnétiques; W. Fisk, Magnetic secular variation and solar activity; J. A. Fleming, searches of the Department of Terrestrial Magnetism of the Carnegie stitution of Washington bearing on solar activity and the earth's gnetic and electric fields; W. M. H. Greaves, Discussion of the Greenwich lar and magnetic data; R. Gunn, Review of certain contributions to solar d terrestrial magnetism; L. Harang, Memorandum on investigations of rora at Nordlysobservatoriet (Auroral Observatory), Tromsö; E. O. Hulburt, e ultraviolet-light theory of aurorae and magnetic storms; V. A. stitzin, On the relation of magnetic agitation to solar activity; M. et Ie. H. Labrouste, Composantes périodiques de l'activité solaire et mposantes correspondantes dans le magnétisme terrestre; J. C. McLennen, the auroral green line; D. H. Menzel, Auroral phenomena and the solar romosphere; H. T. Stetson, The correlation of solar and lunar phenomena th the ionization of the earth's atmosphere; C. Störmer, Auroral researc .

Professor S. Chapman, the first chairman of the commission, and himself successful worker in this field, deserves high credit for editing these eports. By inviting the investigators to contribute summaries of their ork, he has made the reports fairly complete compendia of the status of r knowledge regarding solar and terrestrial relationships. That this a distinct help to individual research as well as to collaboration is vious, considering the fact that the papers on this subject are cattered in physical, geophysical, astronomical, and meteorological urnals.

The report is neatly reproduced by the planograph method, which, on count of convenience and economy, is now becoming more widely used for blications of this character. H. D. Harradon's review reprinted from rrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 37, . 1, p. 91, 1932.

10. PATENTS

(888) PROCESS OF AND APPARATUS FOR LOCATING MINERAL DEPOSITS IN SUBSURFACE EARTH STRATA

Thomas S. West, of Drumright, Oklahoma

United States patent 1,845,379. Patent issued February 16, 1932.

The invention relates to an apparatus for locating ore, oil, gas and other mineral substances embodying an electrode adapted to be lowered into a well by an insulated conductor and into electrical connection with a desired stratum, means for insulating said conductor and electrode from a desired portion of the well's wall, means for measuring the magnitude, phase relations, and other characteristics of electric current electrically connected at a point distant from the well with the stratum through a different earth stratum, means connected to the measuring means for regulating the current, and means connected between the regulating means and the conductor for producing an electrical potential difference there between.

Claims allowed - 5.

(889) METHOD AND APPARATUS FOR DETERMINING DISTANCE BY ECHO

Reginald A. Fessenden, of Chestnut Hill,
Massachusetts.

United States patent 1,853,119. Patent issued April 12, 1932.

The invention relates to method and apparatus for locating the position of objects by echo, particularly their distance and direction; it includes especially the receipt of such echo by means of a flash of light in connection with a scale whereby observations may be secured from which the distance from a station to the object to be located may be determined.

Claims allowed - 12.

(890) IMPROVEMENTS RELATING TO SEISMOGRAPHS, AND APPLICABLE TO OTHER MEASURING INSTRUMENTS

Anglo-Persian Oil Co., (Ltd.), a British Joint-Stock Corporation,
and John Hugh Jones of Hastings, County of Sussex.

British patent 323,552. Patent issued January 9, 1930.

This invention relates to means for indicating or recording small displacements and for indicating or registering minute electrical currents. Means for measuring small displacements or minute electrical currents applicable to smographs and other measuring instruments, wherein an iron armature is pended in a direction transverse to a rapidly varying magnetic field having ongly curved lines of force in such manner that it will take up a position allel, or nearly parallel, to the tangent to a particular line of force at particular point, so that on relative movement of the armature and the rce of the magnetic field, or on distortion of the magnetic field, the ature will take up a new position.

Claims allowed - 6.

(891) IMPROVEMENTS RELATING TO SEISMOGRAPHS, AND APPLICABLE TO OTHER MEASURING INSTRUMENTS.

glo-Persian Oil Co. (Ltd.), of London, a British Joint-Stock Corporation,
and John Hugh Jones, Ph.D., of Hastings, County of Sussex.

itish patent 343,917. Patent issued February 23, 1931.

This invention relates to an improvement in or modification of the invenon described in Specification No. 323,552 and consists in an improved conruction of the magnetic magnifier by which greater sensitiveness of operation be secured.

According to the invention, the magnetic field is produced by a plurality magnets so disposed that the lines of force in which the magnetic element set are not only strongly curved but also concentrated to a greater intensity. reover, means may be provided, for example, in the form of coils applied to or more of the magnets, whereby the magnetic field may be controlled as to tensity or direction and may be distorted at will.

Claims allowed - 7.

(892) A PROCESS FOR DETERMINING THE POTASSIUM CONTENT IN SPACES CONTAINING POTASSIUM

Werner Kolhörster of Berlin-Friedenau, Germany.

itish patent 340,231. Patent issued December 12, 1930.

The present invention relates to a device for determining the potassium tent in spaces which contain potassium compounds in any state of aggregation tsoever, comprising a tubular ionization vessel with an electrode passing ough the same, and having a potential of about 1,000 volts or upwards set between these two parts, the ionization vessel being affected by the gamma iation emitted by the potassium so that owing to the high potential differe existing between the outer wall and the inner electrode, an intense ization by collision is set up so that each incoming ray produces, in an er circuit, urrent shocks of such intensity that they are recorded on a ording strip either directly or after amplification has taken place, or are ed up by a counting device.

Claims allowed - 1.

(893) IMPROVEMENTS IN APPARATUS FOR DETERMINING POTASSIUM CONTENT IN SPACES CONTAINING POTASSIUM

Werner Kolhörster of Berlin-Lichterfelde, Germany.

British patent 351,266. Patent issued June 25, 1931.

This invention relates to an improvement or modification of the invention set forth in Patent Specification No. 340,231.

According to the present invention, the improvement or modification consists of the fact that the apparatus for determining the potassium content includes a rotating impulse relay in the form of a rotative selector as used in automatic telephony, or a continuous current electrical meter, adapted to summate and indicate current impulses of high frequency, as produced by the ionization set up by the gamma rays emitted by the potassium. Preferably, means is provided whereby the current impulses to be summed and indicated are first amplified.

Claims allowed - 9.

(894) METHOD AND APPARATUS FOR DETECTING MINERAL AND OTHER DEPOSITS

Doctor Günther Laubmeyer of Kassel-Wilhelmshöhe, Germany.

British patent 352,269. Patent issued July 9, 1931.

The method according to the invention consists in collecting underground air by means of a special apparatus and in testing it quantitatively as to the existence of gaseous substances which are in direct relation with the deposits. The apparatus used for working the method is constructed with the purpose of not giving any possibility of interchange with the open air to the underground air which has been collected by parts of the apparatus.

The apparatus is constructed as a closure or lid for borings, the lid having besides an outlet pipe at least one cylinder or the like surrounding the outlet pipe; the diameter of this cylinder being larger than that of the borehole. A particularly preferred construction which has been found very practicable contains two concentrically arranged cylinders, is provided with an outlet pipe and closes the borehole tightly.

Claims allowed - 7.

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Senior physicist, U. S. Bureau of Mines.

1. GRAVITATIONAL METHODS

(895) NOUVELLE MÉTHODE DE MESURE DE LA GRAVITÉ

(NEW METHOD FOR MEASURING GRAVITY)

By M. F. Holweck

Socíété des Ingénieurs Civils, Séance du 22 April, 1932.

The author makes use of an astatic pendulum in which the forces of gravitation are, to a great extent, compensated by the forces of a constant flection produced by a thin plate made of elinvar steel (a material the elastic modulus of which changes very little with the change of temperature). The total weight of the oscillating mass is only a few grams, and thus corrections caused by affecting the support can be eliminated.

The pendulum described is many times more sensitive to the variations of "g" than the ordinary pendulum. It is sufficient to measure its frequency with a simple pocket chronograph in order to obtain in 10 minutes the number sought for with an accuracy of about one or two millionths; this is accomplished by means of a device which does not exceed some 10 kilograms in weight and which can be installed at any place.

The author shows the diagrams by which the sensitivity of the instrument is proved and gives values obtained from experiments.--V. Perebaskine's abstract translated by W. Ayvazoglou.

(896) MESURES DE GRAVITÉ AU MOYEN DE L'APPAREIL HOLWECK-LEJAY NO. 2

(GRAVITY MEASUREMENTS BY MEANS OF HOLWECK-LEJAY'S NO. 2 APPARATUS)

By P. Lejay and R. Goudey

Comptes Rendus de l'Académie des Sciences, Paris,
vol. 194, No. 19, 1932, p. 1632.

The authors obtained for Besancon the following value for "g":

$$G = 980.751 \text{ centimeters/sec}^2$$

This figure is in very good accord with that obtained from the results of the first series of measurements.--V. Perebaskine.

(897) TORSION BALANCE WITH THREE BEAMS (IN RUSSIAN)

By B. Numerov

letin de l'Institut Astronomique, Leningrad, No. 30, 1931, pp. 103-108.

A model of a torsion balance with three inclined beams was constructed 1928-29 at the Astronomical Institute. A photograph of the instrument is en.

The new torsion balance has been constructed for visual observations was to possess the following features and advantages:

1. In the 3-beam system we have a continual check over the work of the ance, as the mean of the readings of the three beams must remain constant any azimuth.

2. For the determination of the gradients of the variation of gravity it fices to effect observations in two azimuths only at 0° and 180° or at 90° 270°

3. To determine the curvature gradients we have but to make an additional ervation in the third azimuth.

4. Owing to the fact that there is no need repeatedly to make checking ervations, and as in the general gravity survey we can limit our selves to ervations of the gradients of gravity variation alone--that is, to effect ervations in two azimuths--it is rational to keep to visual observations.

5. Every beam system, together with the cap, may be changed independent- of the other beams.

6. The instrument may be turned by hand, without any clockwork, and its ting in the azimuth and the leveling are done by means of a compass and a el fixed to the upper lid of the case covering the three beams.

7. The arresting of the three beams may be done simultaneously.

In the beginning of 1931 Bamberg's firm constructed the apparatus accord- to our indications, introducing, however, a very important improvement-- ely, a new system of damping which allowed the observations in one azimuth be completed within 20 minutes. Thus we actually are able to finish the ervations and to check them at the given place within one hour.

In this article formulas and an example of computing the gradients by ob- vations of the three beams in azimuths 0°, 90°, 180°, and 270° are given.

Preliminary results obtained with the new torsion balance, the speed of observations, and the check at the observations show that the new type of eam torsion balance presents a considerable advantage over the old system affords a manifold increase in the efficiency of the general gravity vey.--Author's abstract.

(898) GRAVITY DETERMINATION IN VIRITSA AND DETSKOE SELO (IN RUSSIAN)

By A. M. Gishitsky

Bulletin de l'Institut Astronomique, Leningrad, No. 30, 1931, pp. 108-109.

In the spring of 1929 a determination of gravity was carried out in Viritsa, Detskoe Selo, and the astronomical observatory of the University of Leningrad. Bamberg's apparatus with pendulums, Nos. 116, 117, 118, and 119, served for the observations. The Astronomical Institute was accepted as the starting point with g = 981.927. In Viritsa and Detskoe Selo 16 pendulum observations were made during one day. The rate of the contact chronometer was determined by Bordeaux rythmic signals. At the astronomical observatory of the university the work was effected by means of Nardin chronometer 1146, and at other points with Nardin chronometer 2297. The co-swinging of the support was determined by Borras' method. A table gives the durations of the swinging of pendulums at different points. The rate of Nardin chronometer 1146 was changing more than 2 seconds during the process of the work, thus the observations at the astronomical observatory of the university are not reliable and can not be used to transfer the gravity from this point to the Astronomical Institute. A table shows the results of the final elaboration of the observations. The theoretical value of gravity is computed in Helmert's formula of 1909. The observations point to a considerable decrease of gravity south of Detskoe Selo; this agrees with the results obtained previously.--Author's abstract.

(899) GRAVITY DETERMINATIONS IN WEST SIBERIA (IN RUSSIAN)

By A. M. Gishitsky

Bulletin de l'Institut Astronomique, Leningrad, No. 30, 1931, pp. 109-113.

In the summer of 1930 gravity determinations were carried out between Tcheliabinsk and Petropavlovsk with the purpose of locating mountain ranges buried under the west Siberian plain. The observations were made by means of four Sterneck pendulums, Nos. 95, 96, 97, and 127, at 13 stations.

The pendulums were suspended to a special support constructed in the work shop of the Astronomical Institute. Its structure differs somewhat from that usually adopted: The plate to which the four pendulums are suspended is fastened to the support having the shape of a truncated cone. In the center it has a considerable aperture through which the pendulums are lowered into the apparatus. After the pendulums are suspended the aperture is closed by a plate on which the optical part of the apparatus is mounted. The thermometer is in the center of the apparatus. After the installation the apparatus is covered at the top by a ground lid having the shape of a disk.

The Astronomical Institute served as a starting point with G = 981.927. Twelve pendulum observations were made at each point during half a day and ce as great a number of observations at the starting point. The time was ermined by Bordeaux rythmic signals. The co-swinging of the support was ermined at the beginning and at the end of the observations by Borras' hod in two mutually perpendicular directions. The altitude was determined means of barometric leveling with relation to the railway line.

The duration of the swinging of pendulums at different points is given a table. The theoretical value of gravity was calculated by using Helmert's mula. The final result is shown in a table.

A curve is drawn to show the variation of gravity along the profile be- een Slatoust and Tcheliabinsk.

The points where the gravity was determined in previous years are shown uthor's abstract.

(900) EIN NEUER INTEGRATOR ZUE BERECHNUNG VON SCHWEREWERTEN

(A NEW INTEGRATOR FOR CALCULATING GRAVITY VALUES)

By F. Kaselitz

itschrift für Geophysik, Braunschweig, vol. 8, No. 3|4, 1932, pp. 191-195.

A description of the apparatus and of its operation is given. A photo- aphic picture is added.

According to the author, an accuracy of about 5 per cent can be obtained; at is, the instrument answers entirely the demands of practical work, taking to consideration the fact that the gradients are often measured with a ch smaller accuracy.

In addition to the saving of time the apparatus has the advantage of oiding possible mistakes in calculation and in counting.--W. Ayvazoglou.

(901) SUR LE PENDULE DE GRAVITÉ

(ON THE GRAVITY PENDULUM)

By J. Haag

omptes Rendus de l'Académie des Sciences, Paris, vol. 193, No. 26, 1931, pp. 1391-1393.

Theoretical investigations on the period of oscillation of a pendulum pended to an elastic spring or fastened at its lower end by means of an stic spring are discussed.--W. Ayvazoglou.

(902) GRAVITY ANOMALIES

By E. A. Glennie

Nature, London, vol. 128, No. 3241, 1932, p. 1004.

As a result of a somewhat lengthy investigation of large negative and positive anomalies in India, the author draws the conclusion that the Hayford hypothesis of isostatic compensation is incorrect, and that gravity anomalies can be adequately explained by a warping up and down of the crustal layers. The author says that although these conclusions have been mainly derived from observations made in India, there appears to be good evidence that gravity anomalies, outside India in both continental and oceanic areas, can be successfully explained by crustal warpings without compensation.

A paper describing these investigations will be published as one of the professional papers of the Survey of India.--W. Ayvazoglou.

(903) THE EFFECT OF STRATIFICATION ON THE GRAVITY GRADIENT AND THE CURVATURE OF THE LEVEL SURFACE

By Edith A. Nelson

Philosophical Magazine, London, vol. 10, No. 64, 1930, pp. 513-517.

From a mathematical discussion of the effect of stratification on the gravity gradient and the curvature of the level surface, the author concludes that when, in a survey of a region with the Eötvös balance, the curvature vector changes sign where the gradient is a maximum, the earth's crust in that region is stratified, the edge of the stratum being situated below the point of the maximum gradient.--W. Ayvazoglou.

(904) ON THE ABSOLUTE DETERMINATION OF GRAVITY

By A. C. Longden

The Physical Review, Minneapolis, vol. 38, No. 10, 1931, p. 1920.

This is an abstract given by the Physical Review on a paper read at the regular meeting of the American Physical Society held in New York on September 10, 11, and 12, 1931:

> The importance of a new determination is discussed. In the work here described, a reversible pendulum is used in which roller bearings are substituted for knife edges, and quartz suspension rods or tubes are used instead of metal. Invar is disqualified on account of its magnetic properties. The period of the pendulum is determined to within 1 or 2 parts in a million by a very direct method which involves no corrections and which can be performed in a few minutes, while the

pendulum is swinging through a very small amplitude and while the change of amplitude is quite negligible. The author points out the errors of the "coincidence method" as it is generally used, and shows that it may either be improved, or abandoned as unnecessary. He also cites some of the results on record, which are accepted as highly exact, but which in reality include rather large errors. The method includes a number of refinements in comparing the length of the pendulum with that of a standardized invar rod.

2. MAGNETIC METHODS

(905) MAGNETOMETRIC INVESTIGATION OF MANGANESE ORE DEPOSITS (IN RUSSIAN)

By N. Trubiatchinski

Transactions of the United Geological and Prospecting Service of U.S.S.R., Leningrad, No. 166, 1932, 64 pp.

A magnetic micro-survey was carried out in 1928 and 1929 for determining influence of manganese ore (MnO_2) upon a homogeneous geomagnetic field.

This task was accomplished in the Nicopol manganese region by a magneto-ric field party under the supervision of Trubiatchinski. The method of vestigation as described in the "Handbook of magnetic survey" by N. V. Rose N. Trubiatchinski (see Geophys. Abs. 10, p. 10) were applied. The sults of investigations are given in the annexed maps and tables.

According to the interpretation of the magnetic map, including more than per cent of the Nicopol region of manganese ore deposits, the following ditions must be considered to be established:

1. Weak magnetic anomalies were observed everywhere above the manganese posits; the intensity of the anomalies increased with the magnitude of the ganese layer.

2. A normal homogeneous geomagnetic field was not observed at any place ve the manganese deposits.

3. No manganese deposits could be found in regions with normal magnetic ld.

4. In regions with weak magnetic anomalies manganese ores, as well as n deposits, were established.

Based on these four conditions the author draws the following conclu-ns:

(a) There is no use to search for manganese ore in regions free of weak netic anomalies.

(b) In regions with weak magnetic anomalies in addition to manganese ore various iron ores may be found also.

A manganese deposit of considerable magnitude was found by the magnetic method in the area located between the villages of Marievka and Grushovka.--W. Ayvazoglou.

(906) SUR LA MESURE DIRECTE DES SUSCEPTIBILITÉS MAGNÉTIQUES DES LIQUIDES PAR LA BALANCE MAGNÉTIQUE CURIE-CHÉNEVEAU

(CONCERNING THE DIRECT MEASUREMENTS OF MAGNETIC SUSCEPTIBILITIES OF LIQUIDS BY MEANS OF THE CURIE-CHÉNEVEAU MAGNETIC BALANCE)

By C. Chéneveau and C. Courty

Comptes Rendus de l'Académie des Sciences, Paris, vol. 194, No. 1, 1932, pp. 75-76.

The authors prove that is is possible to measure directly the magnetic susceptibility of a liquid, even with a tube calibrated in a usual way, by means of the Curie-Chéneveau magnetic balance, without the necessity of weighing and determining the density of the liquid. The density is not taken into consideration, even for the correction of the magnetism.--V. Perebaskine.

(907) VALEURS DES ÉLÉMENTS MAGNÉTIQUES À LA STATION DU VAL-JOYEUX (SEINE-ET-OISE) AU 1-ER JANVIER 1932

(VALUES OF MAGNETIC ELEMENTS AT THE STATION OF VAL-JOYEUX ON JANUARY 1, 1932)

By L. Eble and G. Gibault

Comptes Rendus de l'Académie des Sciences, Paris, vol. 194. No. 11, 1932, p. 1008.

Mean values from all hourly values obtained during the months of December, 1931, and January, 1932,--that is, from 1,488 readings,--are given.

The secular variation presents the same characteristics as in January, 1931.--V. Perebaskine.

(908) A NEW AID TO EXPLORATION IN THE LAKE SUPERIOR DISTRICT

By Holman I. Pearl

Proceedings of the Lake Superior Mining Institute, vol. 28, 1930, pp. 85-98.

A description of the Hotchkiss superdip is given. Its advantages over most other types of dip needles are given as follows:

1. Rapid field manipulation.

2. Equal facility in measuring the whole range of magnetic anomalies
om 10 gammas to thousands of gammas.

3. Combination in one instrument of the functions of a dipping circle
d a magnetometer.

The history, principle, constructions, corrections, and sensitivity of
e superdip are briefly examined.

Some typical examples of field tests with the superdip, with particular
ference to a comparison of results with those obtained with the dip needle
e outlined.--W. Ayvazoglou.

909) ÜBER DIE PHYSIKALISCHE NATUR DES MAGNETISCHEN RINDENFELDES DER ERDE

(ON THE PHYSICAL STRUCTURE OF THE MAGNETIC FIELD OF THE EARTH'S CRUST)

By H. Haalck

itschrift für Geophysik, Braunschweig, vol. 8, No. 3|4, 1932, pp. 154-163.

Under the supposition that the permanent magnetic field of the solid
rth body consists of a primary core-field of symmetrical rotation by which
secondary field is induced in the outer earth's crust, the strength of the
tter depending on the different magnetisability of the earth's crust from
ace to place, the author examines the question as to what parts of the
rth's crust if compared with the adjoining parts, are magnetized more
rongly and what parts of it less strongly.

Four distinct regions of stronger magnetizability are established;
rth America, Asia, Australia, and Africa, and one region of weaker mag-
tizability, that of the Southwest Atlantic. The causes for these differ-
ces in magnetizability were proved to depend on the difference in tempera-
re and material (stronger susceptibility of eruptive rocks if compared
th that of ocean water and sediments, probably also the different content
magnetite in single parts of the outer earth's crust).—Author's abstract
anslated by W. Ayvazoglou.

(910) DIE ERDMAGNETISCHE DEKLINATION IN BULGARIEN

(EARTHMAGNETIC DECLINATION IN BULGARIA)

By Ilia Popoff

itschrift für Geophysik, Braunschweig, vol. 8, No. 3|4, 1932, pp. 164-165.

The results of magnetic measurements carried out in 1930 and 1931 for
e determination of the declination in Bulgaria are given in the article.
e values of declination are valid for the time at which they were determined.
. Ayvazoglou.

(911) ABHANDLUNG ÜBER DIE VON DEN ASKANIA-WERKEN ERBAUTE VERTIKAL-FELDWAAGE VON SCHMIDT

(TREATISE CONCERNING SCHMIDT'S VERTICAL FIELD BALANCE MANUFACTURED BY ASKANIA WORKSHOPS)

By Th. Koulomzine and A. Boesch

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 3 4, 1932, pp. 166-180.

This treatise was written in the beginning of 1931. The Askania workshops created independently from our studies a new magnet-system which is remarkably insensitive to temperature changes. Also, stimulated by theoretical consideration of the authors on the 180° rotational movement the Askania firm put on the market a new arrangement of the support with mutual independence of the movement of orientation and of the movement of rotation. This article is therefore of theoretical importance only. The authors express the hope that in a further article they will be able to discuss the theory of the changes accomplished by the Askania firm on the new models of the vertical field balance.--Authors' abstract translated by W. Ayvazoglou.

(912) MAGNETIC SURVEYS OVER DYKES

Editorial note

The Mining Magazine, London, vol. 46, No. 4, 1932, pp. 245-247.

This note gives a brief summary of an article by A. S. Eve and D. A. Keys published in the Canadian Mining and Metallurgical Bulletin for March, 1932, under the title "Magnetic surveys over mineral, diabase, and artificial dykes." An abstract of the article is given in Geophysical Abstracts 38.--W. Ayvazoglou.

(913) A SIMPLE APPARATUS FOR THE MEASUREMENT OF THE HORIZONTAL COMPONENT OF THE EARTH'S MAGNETIC FIELD

By L. F. Bates

Journal of Scientific Instruments, London, vol. 8, No. 10, 1932, pp. 324-326.

The apparatus described in this article is a simple adaptation of the apparatus used by Schuster and F. E. Smith for the determination of the horizontal component of the earth's magnetic field. A simple form of apparatus suitable for rapid work is shown in accompanying figures.--W. Ayvazoglou.

(914) MAGNETIC INVESTIGATIONS AS AN AID TO ECONOMIC GEOLOGY

By R. Krahmann

ransactions of the Geological Society of South Africa, Johannesburg, vol. 33, 1931, pp. 65-89.

Magnetic methods of prospecting are examined by the author in this paper, , according to his opinion, these methods have the most advantages in lving geological and mining problems in South Africa. The headings of the ticles are as follows:

Magnetic susceptibilities of rocks and ores.
Modern instruments.
Costs of magnetic survey.
Theoretical curves.
Some results and their interpretation.
Objects of application.

In his conclusion Krahmann says that from the aspect of the economic ology the application of magnetic investigation may be indicated in the llowing propositions:

The location of iron-ore deposits.

The location of unmagnetic ore deposits such as copper, nickel, etc., f they are associated with intrusions of flows of igneous rocks.

The location of unmagnetic ore deposits such as platinum, tin, chrome, ngsten, etc., if they are associated with magnetic minerals.

The location of noble minerals in placer deposits, such as platinum, ld, osmiridium, etc., if they are deposited together with magnetic sands.

The location of igneous intrusions, plugs, dykes, etc.

The location of tectonic phenomena such as anticlines, synclines, fault nes, etc., if one member of the sedimentary formations is magnetic or diagnetic.

The location of salt domes and associated oil deposits.

The location of oil deposits, if they are associated with tectonic enomena as mentioned above.

The article is completed by 20 figures and a general bibliography.
W. Ayvazoglou.

(915) TEKTONIK UND ERDMAGNETISMUS IN DER PRIEGNITZ

(STRUCTURE AND EARTH MAGNETISM IN THE PRIEGNITZ)

By H. Reich

Zeitschrift der Deutschen Geologischen Gesellschaft, Berlin, vol. 82, No. 10, 1930, p. 720.

North of the bend in the Elbe River near Havelberg a magnetic anomaly was found of about 40 kilometers in length and 25 kilometers in width which also has been indicated by the gravity measurements. The Tertiary (Miocene) structure of the Priegnitz surrounds the region of the disturbing body and extends beyond this region in the southern part. The disturbing region is a part of a well-known very old tectonic feature extending from the Donau to the Elbe; it can be traced geophysically from there northward.--W. Ayvazoglou.

(916) MAGNETISCHES SCHÜRFEN AUF ROT-UND BRAUNEISENERZE

(MAGNETIC PROSPECTING FOR HEMATITE AND BROWN IRON ORES)

By H. Reich

Zeitschrift der Deutschen Geologischen Gesellschaft, Berlin, vol. 83, No. 7, 1931, pp. 502-509.

Contents:

1. Magnetic properties of iron ores.
2. Possibilities for applicability of magnetic methods.
3. Technique of measurements.
4. Results of investigations.
5. Results of calculations.

Magnetic properties of iron ores and their magnetic susceptibilities are discussed. A conclusion is drawn that iron ores are generally magnetized very weakly and are not apt to produce considerable anomalies. Examples of measurement are discussed and the anomalies obtained are given. Theoretical calculations as to the magnitude of anomalies to be expected above a vertical orebody in various depths are examined. According to these calculations it is not likely that these hematite and brown iron ores may be detected at a depth greater than 50 meters.--W. Ayvazoglou.

(917) SOME PHASES OF MAGNETOMETER WORK IN MISSOURI

By H. A. Buehler

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 5, 1932, p. 531.

This paper, of which only the title is given in the bulletin, was presented by the author at the Tulsa Geological Society meeting, May 2, 1932. --W. Ayvazoglou.

(918) GEOMAGNETIC SURVEYS IN ALBERTA

By J. E. Duncan

letin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 5. 1932, p. 531.

This paper was presented by the author at the annual meeting on January and 30 of the Alberta Society of Petroleum Geologists, Calgary, Alberta. contents of the paper are not given.--W. Ayvazoglou.

3. SEISMIC METHODS

919) SUR LA PROPAGATION D'UN SÉISME A L'INTÉRIEUR D'UN SOLIDE HOMOGÈNE, ISOTROPE, ÉLASTIQUE, SEMI-INDÉFINI, LIMITÉ PAR UNE SURFACE PLANE

(ON THE PROPAGATION OF A SHOCK INSIDE OF A HOMOGENEOUS, ISOTROPIC, ELASTIC, SEMI-INDEFINITE SOLID BODY LIMITED BY A PLANE SURFACE)

By L. Cagniard

mptes Rendus de l'Académie des Sciences, Paris, vol. 194, No. 10, 1932, p. 899.

The purpose of the author consists of generalizing the results obtained Lamb. He deals with the problem treated by him as follows:

1. By supposing that the source mentioned is situated at the depth and on the surface.

2. By studying the propagation inside of the ground.

3. By avoiding, in the first place, the resolution into Fourier's egrals.--V. Perebaskine.

(920) SUR LA REFLEXION A LA SURFACE DU SOL D'UNE ONDE SISMIQUE, SPHÉRIQUE ET ISOTROPE

(ON THE REFLECTION ON THE SURFACE OF THE GROUND OF A SEISMIC, SPHERICAL AND ISOTROPIC WAVE)

By L. Cagniard

ntes Rendus de l'Académie des Sciences, Paris, vol. 194, No. 11, 1932, 1005

The author continues his studies concerning the seismic wave (see the vious article).

In this article he describes the function B by which the wave reflected listortion is defined.--V. Perebaskine.

(921) ÜBER DIE DISPERSION SEISMISCHER OBERFLÄCHENWELLEN

(ON THE DISPERSION OF SEISMIC SURFACE WAVES)

By Walter Rohrbach

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 3|4, 1932, pp. 113-129.

Length of the wave and velocity of propagation are calculated from various periods of the surface waves by using especially distinct seismograms recorded in Göttingen, Apia (Samoa), and Zi-Ka-Wei (Shanghai); based on these calculations the dispersion curves of the single earthquakes are drawn.

The factors on which the position and the shape of the dispersion curve depend are examined; the decrease of the velocity of a certain wave length with the increase of the distance of the epicenter and how and where the cross waves and the Rayleigh waves are separated one from another is explained. Finally the depth of the uppermost layer, as well as the transversal velocity in the two uppermost layers are calculated for the Eurasian continent from the dispersion curve.--Author's abstract translated by W. Ayvazoglou.

(922) EIN BEITRAG ZUR THEORIE DER REFLEXION UND BRECHUNG ELASTISCHER WELLEN AN UNSTETIGKEITSFLÄCHEN

(CONTRIBUTION TO THE THEORY OF REFLECTION AND REFRACTION OF ELASTIC WAVES FROM LAYERS OF DISCONTINUITY)

By Heinr. Blut

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 3|4, 1932, pp. 130-144.

Parts of the energy are calculated in which a primary longitudinal wave is separated at the moment of striking upon a surface limiting two different elastic media. Calculations are carried out taking into consideration the secondary transversal effects, as well as disregarding them. It is shown how far this disregarding can be made in numerical calculations.--Author's abstract translated by W. Ayvazoglou.

(923) DAS NORDTIROLER BEBEN VOM 8 OCTOBER 1930. I TEIL

(THE NORTH-TIROL EARTHQUAKE OF OCTOBER 8, 1930. PART I)

By H. Gräfe

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 3|4, 1932, pp. 144-154.

The investigation of this earthquake has been carried out based on 57 diagrams recorded at 27 stations. It was proved that the focus of the quake

a linear extension of 25 kilometers in the direction N.30° E. The line
he focus coincided with a dislocation line of over 40 kilometers of the
ction N.40° E. The depth of the focus of the earthquake calculated by
methods was determined to be 35 kilometers. Travel-time equations were
ved and compared with those obtained from previous European earthquakes.
depth of the P-layer was calculated to be equal to d= 48 kilometers.
thor's abstract translated by W. Ayvazoglou.

(924) SUR CERTAINES ONDES LONGUES RAPIDES, EN PARTICULIER SUR L'ONDE PL D' O. SOMVILLE

(CONCERNING SOME LONG RAPID WAVES, IN PARTICULAR CONCERNING THE O. SOMVILLE'S PL WAVE)

By Coulomb

tes Rendus de l'Académie des Sciences, Paris, vol. 193, No. 23, 1931,
pp. 1211-1214.

Formulas for the displacement component of the PL wave are derived.
present article is written in continuation of Somville's previous
cles published in Gerlands Beiträge der Geophysik, vol. 27, No. 3-4,
; vol. 29, No. 2, 1931; and vol. 33, No. 2, 1931 (see Geophys. Abs.
26, and 32).—W. Ayvazoglou.

) A GALVANOMETRICALLY REGISTERING VERTICAL SEISMOGRAPH WITH TEMPERATURE COMPENSATION

By J. Wilip

et Commentationes Universitatis Tartuensis, Dorpart (Tartu) vol. 20, A,
1931, pp. 1-54.

A description is given of a vertical seismograph with temperature com-
ation, which until now has only been constructed in Estonia.

The theory of this apparatus is deduced and proved by means of measure-
s, the conformity being found to be sufficiently great. Directions are
n for the adjustment of the apparatus and especially of the temperature
ensation. The temperature compensation proves to be very nearly correct
proper treatment, and the vertical seismograph will stand prolonged
ing in the pendulum room without any protection against heat.

Methods are discussed for a more precise adjustment of the period symmetry.

The pendulum shows a regular oscillation with a weak proper damping, the
od depending only very little on the amplitude.

The principles of construction advocated by the author have proved suc-
ful and allow a general application of them to be expected in the construc-
of vertical seismographs of different sensitiveness and methods of regis-
ion.

With a loosely fitting cover the influence of variable atmospheric pressure is observed. The seismograph acts like a baroscope.

The dependence of the proper period on the temperature is ascertained and a method is recommended for easily avoiding possible errors.

The constants are determined and the sensitiveness is examined, which gives a maximum magnetification of about 1,500 times and may be increased at wish.

A secondary phenomenon is observed in the apparatus, and precautionary measures are indicated for its removal.

The differences of temperature outside and inside the glass cover is examined.

Henceforth cellar rooms with small annual amplitude of temperature variations are found to be unnecessary for the erection of seismographs. Any quiet room with provision for heating can be used as a room for a seismic station.

In conclusion the principal formulas which may be conveniently applied in the galvanometric registration method are given.—Author's abstract.

(926) A THREE-DIMENSIONAL VIBROGRAPH

By J. E. Shrader

The Physical Review, Minneapolis, vol. 38, No. 10, 1931, p. 1923.

This paper was reported at the regular meeting of the American Physical Society held in New York on September 10, 11, and 12, 1931.

It deals with a new vibrograph which has been devised for indicating and recording simultaneously in the same plane vibrations of a body in each of three directions mutually perpendicular. The vibrograph operates on the seismographic principle. The instrument shows amplitude of vibration, wave form, phase relations and frequency of three components of vibration simultaneously on the same plane.--W. Ayvazoglou.

4. ELECTRICAL METHODS

(927) BEITRÄGE ZUR MESSTECHNIK UND ANWENDUNG DER METHODE DES SCHEINBAREN SPEZIFISCHEN WIDERSTANDES

NTRIBUTION TO THE TECHNIQUE OF MEASUREMENT AND APPLICATION OF THE METHOD OF THE APPARENT SPECIFIC RESISTANCE)

By W. Stern

tschrift für Geophysik, Braunschweig, vol. 8, No. 3|4, 1932, pp. 181-191.

Theoretical principles of geoelectrical methods for prospecting the sub- consisting of horizontal layers based on the measurements of the "appar- specific resistance" are examined. As the derivation of these formulas already done by J. N. Hummel (Zeitschrift für Geophysik, vol. 5, No. 3|4 5|6, see Geophys. Abs. 9 and 10), the author uses here only the basic ulas necessary for the interpretation of homogeneous, isotropic subsoil isting of horizontal layers. The arrangement of the measurements is de- bed and the results of measurements carried out in the lignite-fields of e (Lower Rhine) are given. The results were confirmed by borings.-- or's abstract translated by W. Ayvazoglou.

(928) ELECTRICAL PROSPECTING FOR AURIFEROUS QUARTZ VEINS AND REEFS

By Helmer Hedström

The Mining Magazine, London, vol. 46, No. 4, 1932, pp. 201-213.

The present article is intended as a brief description of some new appli- ons of those geoelectrical methods which are characterized by the determina- of electrical potentials. These "potential methods" have previously been almost solely for the locating of buried bodies of better electrical con- ivity than the surroundings. The new applications of these methods are to locate or determine the distance to boundary planes between different formations. According to whether these boundary planes are nearly zontal or nearly vertical, the new applications are divided by the author the two following classes:

1. "Electrical drilling," which comprises the determination of thickness verburden, depth to the ground water table, dip of slightly inclined sedi- ary beds at moderate depth, etc. This process is not discussed by the or as it has been dealt with already in many recent publications.

2. "Electrical trenching," comprises the locating of hidden contacts, t planes, quartz veins, bankets, and reefs. This process should, accord- to the author, be of particular interest to mining men in these times of easing activity in the field of gold prospecting.

Theoretical considerations of "electrical trenching" are explained and examples of practical results given.

Thirteen figures accompany the article.--W. Ayvazoglou.

(929) CHAMP ÉLECTROMAGNÉTIQUE PRODUIT PAR UN FIL PARCOURU PAR UN CURRANT ALTERNATIF SINUSOÏDAL AU-DESSUS D'UNE COUCHE CONDUCTRICE

(THE ELECTROMAGNETIC FIELD PRODUCED BY A WIRE CARRYING A SINUSOIDAL ALTERNATING CURRENT ABOVE A CONDUCTING LAYER)

By Dubordieu

Comptes Rendus de l'Académie des Sciences, Paris, vol. 194, No. 10, 1932, p. 848.

Mathematical discussion on the question is given.--W. Ayvazoglou.

(930) POTENTIAL DUE TO A BURIED SPHEROID

By J. H. Webb

The Physical Review, Minneapolis, vol. 38, No. 11, 1931, pp. 2056-2068.

In a previous article, "Potential due to a buried sphere" (see Geophys. Abs. 23, p. 76) the author indicated the solution of the problem. The purpose of the present paper is to extend the solution of that problem to the case of a buried spheroid.

Author's abstract reads as follows:

> A series solution of the problem dealing with the electrical potential due to a buried conducting spheroid under the influence of a surface point electrode is given. The problem is complicated by the boundary condition requiring the vanishing of the normal derivative of potential on the surface of the half space. This condition is satisfied by placing an image spheroid in the upper half space. The problem then reduces to that of finding the potential due to two spheroids whose potentials react upon each other. The interaction of the potentials is handled analytically by means of a transformation theorem in spheroidal harmonics dur to B. Datta. The method of solution employed leads to an infinite number of equations in an infinity of unknowns. An approximate method for solving these questions is given. It is believed by the author that the inverse distance formula in spheroidal harmonics, which is derived, is new.--W. Ayvazoglou.

(931) THE ELECTRICAL PROPERTIES OF THE SOIL AT RADIO FREQUENCIES

By J. A. Ratcliffe and F. W. G. White

Philosophical Magazine, London, vol. 10, No. 65, 1930, pp. 667-680.

Laboratory experiments have been made at radio frequencies to investigate way in which the effective conductivity σ and the effective dielectric con- nd ε of the soil vary with frequency. The results of the experiments are wn in figures. The bearing of these results on some problems of the pro- ation of wireless waves is discussed, and the conclusion is reached that only satisfactory way of measuring these quantities is to measure them ground in situ and at the frequency required, either by the tilt method by means of attenuation curves.--Authors' abstract.

5. RADIOACTIVE METHODS

(932) THE VARIATION OF PENETRATING RADIATION WITH ZENITH DISTANCE

By Gilberto Bernardini

Nature, London, vol. 129, No. 3259, 1932, pp. 578-579.

In this article the author describes his attempt to investigate the blem of the variation of penetrating radiation with zenith distance. The surements were made in a wooden hut, the walls and roof of which were 3.5 timeters thick. For the purpose of observing only the rays coming from a atively small solid angle, the author used the coincidence method between impulses of two Geiger-Muller tube counters. To eliminate the softer ponent of the penetrating radiation, a block of lead 5 centimeters thick interposed between the two counters at a distance of 0.7 centimeter from lower one.

The results are as follows:

ϕ	=	0	20	40	60	75
ncidences in $17^h\ 20^m$	=	1616	1441	1018	404	181
ber per hour	=	93.2 ± 2.5	83.2 ± 2.5	58.4 ± 2.2	23.3 ± 1.7	10.5 ± 1.4

In the first line are shown the values of the angle ϕ between the vertical the plane containing the axes of the counters; in the second the total num- of coincidences observed in $17^h\ 20^m$ in each of these positions. The casual ncidences, amounting to 13.8 per hour, have been deducted from the above ures. The third line shows the mean value of the number of coincidences in hour, with the corresponding statistical error. These latter values are represented graphically.

The author concludes that he notes from the results that the intensity curve, as a function of the zenithal angle, seems to be somewhat sharper than would be expected from absorptions by the atmosphere.--W. Ayvazoglou.

(933) AUTOMATIC RECORDING OF HEAVISIDE LAYER HEIGHTS

By Eric L. C. White

Nature, London, vol. 129, No. 3259, 1932, p. 579.

The author gives sample records obtained by a method developed by him for continuous automatic recording of Heaviside layer heights.

The records, given in a figure, show the following results:

(a) Jump from E layer (110 km.) to F layer (330 km.).

(b) Splitting of echo from F layer. The upper component apparently vanishes due to electron limitation, while the lower component persists.

The author expects to publish further details of the method in the near future.--W. Ayvazoglou.

(934) RADIOLOGICAL INVESTIGATION OF THE PSECUP'S MINERAL SPRINGS (IN RUSSIAN)

By E. Tsitovich

Transactions of the Geological and Prospecting Service of U.S.S.R., 1932, No. 102, pp. 135-163.

The author investigated:

1. Nineteen mineral springs, 17 in situ, by means of the Makbe and Meyer type fontactometer and by the laboratory indoor method by means of the emanation electroscope, according to the X-ray method.

2. Thirty-three core samples from various boreholes, by the same laboratory methods.

3. Three platforms on the earth's surface with respect to the radioactivity of the air, by means of a fontactometer.

The radioactivity (measured in Mache's units with introduction of corrections) of the Psekup's mineral springs proved to be, on the whole, small, varying from 0.1 to 2.1 M-E.

The radioactivity of the waters from boreholes was determined not only for samples taken on the surface but also from a depth.

The laboratory investigation of samples taken from the same springs after period necessary for obtaining a radioactive equilibrium of the emanation th the radium, showed that the samples measured according to the X-ray thod by means of the emanation electroscope displayed a considerably greater dioactivity than the samples measured by means of the fontactometer in situ, namely, from 0149 to 4.03 M-E, which corresponded to a radium content in em varying from $0.177 \cdot 10^{-9}$ to $1.466 \cdot 10^{-9}$ grams per liter of water.

The investigation of the radioactivity of drill cores taken at various pths from 3 to 184 meters showed that the radium content of 1 gram of the ck varied from $0.04 \cdot 10^{-10}$ to $4.00 \cdot 10^{-10}$ grams. The variation of the dioactivity of the cores taken from various depths in the same boreholes owed that strata of the earth having greater radioactivity are generally t located at a great depth.

As a general rule the radioactivity of rocks decreases with the increase the depth of their location. The radioactivity of the rocks and of the mples of water taken from similar depths corresponded.

For the investigation of the radioactivity of air, carried out at two aces in a park (at distance between them equal to 400 to 450 meters) and at place outside of the park about 1.5 kilometers distant, the author used the thod of depositing on the isolated conductor with a high negative potential e products of splitting the emanation and after this of measuring the radiotivity of the wire by means of a fontactometer, taking all possible precauons of constructive character with respect to the method of coiling this nductor and making the necessary corrections. He found that 1 meter of wire the mineral platform lost 29.83 to 39.3 volts per hour; on the platform ar the Jubilee spring 211.9 to 226.2, and on the platform near the iodine omic spring (outside of the park) 117.4 to 141 volts.--W. Ayvazoglou.

(935) RADIUM IN ROCKS: LOCATION AND ASSOCIATION OF RADIUM IN IGNEOUS ROCKS

By C. S. Piggot and H. E. Merwin

American Journal of Science, New Haven, vol. 23, No. 133, 1932, pp. 49-56.

Two granites of high radium content were separated into their component nerals and these examined in detail for radium.

The radium is associated much more with the micas, weight for weight, an with the other components of the rock. Why this should be so is not evint.

Hot water removes from most powdered specimens some of the emanation in uilibrium with the radium present but apparently does not affect this radium, l probably not the parent uranium. It did not affect the radioactivity of e biotite at all.

The radioactivity of leached samples was completely restored after 30 ys.--Authors' abstract.

(936) A NEW EXPERIMENT BEARING ON COSMIC-RAY PHENOMENA

By L. M. Mott-Smith and G. L. Locker

The Physical Review, Minneapolis, vol. 38, No. 8, 1931, pp. 1399-1408.

This new experiment consists in combining a Wilson cloud expansion apparatus with Geiger-Müller electron counters in a manner which permits the simultaneous study of individual cosmic-ray particles by the two methods. Its purpose was to see whether the coincidence effect in electron counters is actually caused by the passage of an ionizing particle through them as has been generally assumed. This was considered desirable because it was felt that the several conflicting cosmic-ray experiments could perhaps be more satisfactorily explained by assuming the coincidences to be produced by photons In this work a series of expansion photographs was taken under experimental conditions which allowed a definite correlation of an ion-track appearing in the expansion chamber with a discharge of a Geiger-Müller counter. It was found that the discharges of a counter due to cosmic radiation are accompanied by ion tracks resembling those due to fast β rays from radioactive sources. This result means that, in accord with previous beliefs, the coincidence effects are caused by ionizing particles. The best assumption we can make at present appears to be that these are high-energy electrons. The possibility that these effects are due to photons appears to be excluded, so that the reconciliation of the conflicting experimental data in this field will have to follow other lines.--Authors' abstract.

(937) BESTIMMUNG DER KONSTANTEN, INSBESONDERE DER KAPAZITÄT VON STRAHLUNGSAPPARATEN

(THE DETERMINATION OF CONSTANTS, ESPECIALLY OF CAPACITIES OF IONIZATION CHAMBER

By Werner Kolhörster

Physikalische Zeitschrift, Leipzig, vol. 31, No. 6, 1930, pp. 280-284.

The author outlines the results of his experience concerning the accuracy with which the constants of ionization chambers can be determined. Examples of measurements are given.--W. Ayvazoglou.

(938) ZUR KAPAZITÄTSBESTIMMUNG VON STRAHLUNGS APPARATEN

(CONCERNING THE DETERMINATION OF CAPACITIES OF IONIZATION CHAMBERS)

By V. F. Hess and A. Reitz

Physikalische Zeitschrift, Leipzig, vol. 31, No. 6, 1930, pp. 284-288.

Investigations concerning the determination of the capacities of ionization chambers in connection with Kolhorster's article foregoings are discussed.--W. Ayvazoglou.

6. GEOTHERMAL METHODS

(939) TEMPERATURE OF FORMATION OF AN EPI-THERMAL ORE DEPOSIT

By H. C. Boydell

lletin of the Institution of Mining and Metallurgy, London, Nos. 331 and 332, 1932, pp. 1-43 and 25-39.

This paper was presented at the 7th ordinary general meeting of the 41st ssion of the Institution, held on April 21, 1932. In this article a discuson of the paper is given.

The present paper provided a striking example of a problem in mining ology attacked by the mathematical method, and in that respect it was not ly novel but almost unique.

The paper inquired into "The extent of temperature rise produced by a va flow on underlying rock, and the influence of such heating on an ore osit formed there."

An actual example, namely the Camp Bird gold mine in southwest Colorado, d been chosen by Boydell for his investigations.

The Camp Bird deposit is briefly described. In the summary given by e author, Boydell enumerates the conclusions drawn from his investigations. V. Ayvazoglou.

(940) RESULTS OF WELL TEMPERATURE TESTS IN WYOMING

By Bravity Taylor

The Petroleum Engineer, Dallas, Tex., vol. 3, No. 8, 1932, p. 64.

The author gives a brief description of a series of experiments carried t by the State oil and gas inspector of Wyoming relative to the temperatures ained in wells in that State.

The description of the apparatus used to obtain temperature measurements wells with the accuracy required for a study of this nature is accompanied an illustration.

The operation of the apparatus is explained.

The average run of well-bottom temperatures in Wyoming has been found, ording to the experiments, to be between 90° and 180°. It has been found t the time element in taking temperatures is a very important one. The pest well in Wyoming, at 8,725 feet in the second Wall Creek sand, was nd to have a temperature of 140°.--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(941) GEOPHYSICAL PROSPECTING

By H. A. Buehler

Biennial report of the State Geologist, Missouri, Bureau of Geology and Mines, 1931, pp. 15-16 and 146-151.

The inauguration of geophysical methods of prospecting in 1929 and conducting field work by using electrical resistivity methods and carrying out magnetic surveys is mentioned in this report. Plates illustrating the results obtained are added.--W. Ayvazoglou.

(942) VARIATION DE LA TENSION SUPERFICILLE DE LA MATIÈRE FULMINANTE EN FONCTION DE LA TEMPERATURE ET DU POIDS MOLÉCULAIRE

(VARIATION OF THE SURFACE TENSION OF THE FULMINANT MATTER IN FUNCTION OF TEMPERATURE AND MOLECULAR WEIGHT)

By E. Mathias

Comptes Rendus de l'Académie des Sciences, Paris, vol. 194, No. 5, 1932, pp. 413-416.

The author concludes that the surface tension of the fulminant (explosive matter is in proportion to the square of the molecular mass, and in an inverse ratio to the cube of the absolute temperature, and that the surface tension of the fulminant matter is, other things being the same, a hundred times greater than that of the ordinary air of the same temperature.--V. Perebaskine.

(943) ÜBER EINE MESSUNG DER BEWEGUNG VON PFEILERN

(CONCERNING THE MEASUREMENT OF THE MOVEMENT OF PILLARS)

By J. Egedal

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 3|4, 1932, pp. 195-196.

The measurements were carried out in a cellar. The instruments (a leveling variometer and a hydrostatic leveling apparatus) were placed on two marble pillars, 5 meters distant one from another. The result of the measurements is graphically represented in a figure. According to the result obtained the author draws the conclusion that the instruments are suitable for measuring small changes in the elevation of the earth's crust.--W. Ayvazoglou.

(944) THE ECONOMIC RELATION OF GEOPHYSICS TO GEOLOGY ON THE GULF COAST

By J. Brian Eby

Economic Geology, Lancaster, Pa., vol. 27, No. 3, 1932, pp. 231-247.

The purpose of this paper is to review briefly the contribution of geo-
ysical research to the mineral exploration of the Gulf coast. The present
d probable future status of geophysics on the coast is discussed and an
tempt is made to relate the geophysical expenditures with the increased
neral valuations, both actual and potential, obtained by these methods.

The results of geophysical exploration are represented graphically,
owing the chronological arrangement of all discoveries on the Texas and
uisiana Gulf coast. The areal distribution of salt domes and other Coastal
oducing fields is shown in a map. Two diagrams are added, one giving the
nual production curve for the Gulf Coast salt-dome region of Louisiana and
xas and showing increasing geophysical production, and another giving the
rve showing annual geophysical costs compared to valuation of oil and sul-
ur produced on Texas and Louisiana Gulf coast.--W. Ayvazoglou.

9. NEW BOOKS

45) Annuaire de l'Institut de Physique du Globe 1930. (Strasbourg, 1931). (Annuary of the Institute of the Physics of the Earth). Part I, Meteorology. Strasbourg, 1931, 20 tables.

46) Davison, Dr. Charles. The Japanese earthquake of 1923. Thomas Murby and Co., London, 1931, 125 pp., 6 plates. Price, 7 s. 6 d. net. In this volume an account of the great Japanese earthquake of 1923 is given from two points of view: First, as it affected man and his works and, secondly, from the viewpoint of geophysics. The geophysical discussion summarizes 41 scientific memoirs, almost entirely by Japanese writers.

47) Hevesy, Georg V., and Paneth, Fritz. Lehrbuch der Radioaktivität (Handbook of radioactivity). Johann Ambrosius Barth, Leipzig, 2d ed., 1931, 287 pp. The data of radioactivity have been brought up to date. The book is an informative, critical, and accurate textbook, covering not only the physical side of the subject with its many topics, but also the chemical and geological sides.

48) Plummer, F. B., and Sargent, E. C. Underground waters and subsurface temperatures of the Woodbine sand in northeast Texas. Univ. of Texas Bull. 3138, October 8, 1931, 178 pp., 56 figures, 9 plates, 8 tables. Published by the University of Texas, Austin. Contents: Introduction; Geology of the Woodbine sand; Underground waters of the Woodbine sand; Normal constituents of Woodbine waters; Abnormal mineral constituents of Woodbine waters; Underground temperatures in the Woodbine sand; Comparison of chemical and thermal investigations; Selected bibliography.

The objectives of the investigation are summed up by the authors as follows: (1) To measure the temperature gradients in wells that penetrate the Woodbine sand in all parts of the province and to ascertain to what extent temperature gradients in the vicinity of abnormal structure and oil pools vary from those in wells on normal structure; (2) to study the chemical composition of the underground waters and ascertain how the composition changes in different parts of the province, especially in relation to abnormal structure and to oil pools; (3) to determine to what extent, if any, a change in the chemical content of the water is responsible for the abnormal temperature gradients along faults and on salt domes; (4) to compile the analytical and thermal data into tables, maps, and diagrams useful to petroleum engineers and geologists.

10. PATENTS

(949) PENDULUM APPARATUS

Josef Andre, of Rochester, New York

United States patent 1,858,384 Patent issued May 17, 1932.

This invention relates to methods of determining the contour of subterranean strata or boundaries of geologic formations. The invention is incorporated in the form of a pendulum apparatus employing one or more pendulums which are constructed and mounted in a novel manner so that their swinging movements may be minutely observed and accurately measured and the necessary computations from the observations and measurements made more accurately and in a shorter time than heretofore.

Claims allowed - 25.

(950) TORSION BALANCE

Ludwig W. Blau, of Houston, Texas, assignor to Standard Oil Development Co.

United States patent 1,861,229 Patent issued May 31, 1932.

The invention comprises the application to the torsion balance of the Kelvin bifilar suspension mirror instead of the usual mirror at the center of the balance beam. The main objects of the invention consist of reducing the time of reading and increasing the reliability of the instrument by shortening the time during which temperature changes or other disturbing causes may influence the exactness of the reading.

Claims allowed - 3.

(951) VARIOMETER

lliam Dubilier, of New Rochelle, New York, assignor to Dubilier Condenser
Corporation, of New York, N. Y., a corporation of Delaware.

ited States patent 1,861,052 Patent issued May 31, 1932.

The object of the invention is to provide a means and method for control-
ng the tuning of a multistage radio receiver over a very wide range, and
th a comparatively small quantity of apparatus, and material for construct-
g the same. The invention comprises the combination with a radio receiving
t having appliances for detecting and amplifying oscillations, of a plurality
devices for controlling said appliances, the devices having the form of
ils with means for varying the effective number of turns thereof, all of the
ils being mounted so that said means can be operated in unison, and the
ils being disposed so that the axis of each is perpendicular to the axis
all the rest.

Claims allowed - 4.

(952) METHOD AND APPARATUS FOR SOUNDING AND FOR LOCATING SUBMARINE OBSTACLES BY MEANS OF ULTRA-AUDIBLE WAVES

Paul Langevin and Charles Louis Florisson, of Paris, France, assignors
to Société de Condensation et d'Applications Méchaniques,
of Paris, France, a corporation of France.

ited States patent 1,858,931 Patent issued May 17, 1932.

The present invention relates to methods and apparatus for producing and
ceiving ultra-audible waves for the accurate determination of the distance
any submarine obstacle capable of reflecting ultra-audible waves.

The method consists in emitting, by means of the piezo-electric apparatus
short signal consisting of a set of ultra-audible waves, and in measuring
e time t between the beginning of the emission and the beginning of the
ception of the waves reflected from the obstacle.

Claims allowed - 2.

(953) OSCILLOGRAPH

Harvey C. Hayes, of Washington, District of Columbia.

ited States patent 1,860,740 Patent issued May 31, 1932.

The invention relates primarily to instruments employed for the indica-
on or recording of slight electrical impulses or disturbances of various
nds. Instruments of the type contemplated usually comprise some form of

string galvanometer and any suitable means for reproducing in magnified form the vibrations produced in the galvanometer string as a result of the electrical impulse imposed upon it.

A primary object of the present invention has been to provide a simple and compact device capable of receiving and reproducing impulses from several sources simultaneously. To this end, in lieu of the single galvanometer string, a plurality of such strings are provided and all are mounted in a single container or holder in such a way as to be in very close proximity and in a definite plane.

Claims allowed - 13.

(954) MEANS AND METHOD OF OBSERVING AND MEASURING ELECTROMAGNETIC FIELDS

Norman H. Ricker, of Houston, Texas, assignor to J. P. Scranton,
of Houston, Texas, Trustee.

United States patent 1,859,005 Patent issued May 17, 1932.

This invention relates to a means and method of measuring alternating electromagnetic fields in general, and finds application in exploring for underground mineral deposits.

One object of this invention is to provide a method of observing and measuring electromagnetic fields based on the use of the differential field between two slightly separated points as compared with the field itself in the neighborhood of these two points.

A further object is to provide an apparatus for making observations by means of this method whereby the nature of the electromagnetic field is determined. A mathematical theory of the method is developed.

Claims allowed - 12.

(955) HORIZONTALVARIOMETER

(HORIZONTAL VARIOMETER)

Dr. Richard Ambronn of Göttingen

German patent 530,166 Patent issued July 22, 1931.

This invention relates to a horizontal variometer, characterized by the connection of a magnetic needle, suspended on the torsion filament, with an optical arrangement for reading the position of the two needle points in the same range of vision, in order to obtain a simultaneous determination of the rotation of the magnetic needle around its vertical axis and of the lateral displacement of the needle caused by the inclination of the variometer toward the vertical line.

Claims allowed - 1.

(956) FELDWAAGE

(FIELD BALANCE)

Hauser and Co., G.m.b.H., of Augsburg

man patent 530,595 Patent issued July 31, 1932.

The invention discloses an arrangement for measuring the vertical earth-netic change of the directing force by means of one or several magnetized ies secured above or below the oscillating system; one or several of these netized bodies are made rotatable about an axis parallel to the axis of illation of the field magnet.

Claims allowed - 1.

(957) DREHWAAGE MIT MEHREREN DAS GEHÄNGE UMGEBENDEN SCHUTZKÄSTEN

(TORSION BALANCE WITH SEVERAL PROTECTING CASINGS SURROUNDING THE SUSPENSION DEVICE)

Askania-Werke A.G. vorm. Centralwerkstatt Dessau und Carl Bamberg-Friedenau of Berlin-Friedenau

man patent 536,306 Patent issued Oct. 22, 1932.

The general object of the present invention is to provide an improvement which the air, at least between the two inner casings surrounding the sus-sion device, is put in constant circulation. In this manner an irregular ting of the most inner protecting casing is avoided.

Claims allowed.- 5.

(958) VERFAHREN ZUR BESTIMMUNG DER MAGNETISCHEN EIGENSCHAFTEN DER OBERSTEN ERDSCHICHTEN

(METHOD FOR DETERMINING THE MAGNETIC PROPERTIES OF THE UPPERMOST EARTH LAYERS)

Hauser and Co., G.m.b.H. of Augsburg and Johannes Ostermeier in Althegnenberg, Obb.

man patent 539,741 Patent issued March 10, 1932,

According to this invention the determination of the magnetic properties the uppermost earth layers is carried out in such a manner that for the culations of the magnetic permeability and of the magnetic susceptibility ained from the data of the earthmagnetic field, an artificial mass defect, able in form and magnitude, is produced in the uppermost earth layer and course of the disturbance of the earthmagnetic field is determined, for ple, by measuring with the magnetic field balance.

Claims allowed - 1.

(959) STROMRICHTUNGSANZEIGER

(POLARITY INDICATOR)

Askania-Werke A.G. vorm. Centralwerkstatt Dessau und Carl Bamberg-
Friedenau of Berlin-Friedenau.

German patent 530,673 Patent issued July 31, 1932.

This invention relates to a polarity indicator and is characterized by the following arrangement: The device is provided with a floating body insid of which there is another body secured to it by means of a Cardan suspension. The two bodies are adjusting themselves: The first in the direction of the current, and the second in the vertical direction. The outer Cardan ring which is firmly secured to the floating body has a graduation arc, and the body provided with the Cardan suspension an adjustable index (or vice versa). The mutual position of these two parts indicates the inclination of the floating body toward the body with Cardan suspension, thus also the direction of the current in a vertical plane.

Claims allowed - 5.

(960) VERFAHREN ZUR ERMITTLUNG VON ELEKTRISCH GUT LEITENDEN, IN EINE FLÜSSIGKEIT VERSENKTEN MASSEN DURCH FESTSTELLUNG DER WIDERSTANDSÄNDERUNG DER FLÜSSIGKEITSSTRECKE ZWISCHEN EINGETAUCHTEN STROMFÜHRENDEN ELEKTRODEN

(METHOD FOR DETECTING BODIES OF GOOD ELECTRIC CONDUCTIVITY SUNK INTO A LIQUID BY DETERMINING THE VARIATION OF THE ELECTRIC RESISTANCE OF THE SECTION OF THE LIQUID BETWEEN THE IMMERSED ELECTRODES CARRYING CURRENT)

James Basset of Paris

German patent 534,562 Patent issued Oct. 1, 1931.

This invention discloses a method for detecting bodies of good electric conductivity sunk into a liquid; the method is characterized by the following arrangement: The electrodes are connected to a cable provided with a pluralit of conductors in such a manner that each conductor is divided into two sections, each of the latter being connected to one of the electrodes; the ends of the sections are provided with synchronously rotating switches.

Claims allowed - 2.

(961) VERFAHREN ZUM ERKENNEN DER DURCH TIEFBOHRLÖCHER DURCHTEUFTEN BODENSCHICHTEN MITTELS ELEKTRISCHER WIDERSTANDSMESSUNG

ETHOD OF INVESTIGATING THE LAYERS OF THE GROUND PENETRATED BY BOREHOLES BY MEANS OF MEASURING THE ELECTRICAL RESISTANCE)

Société de Prospection eléctrique Procédés Schlumberger of Paris

man patent 534,563 Patent issued Sept. 28, 1931.

The invention relates to a method by which the local electrical specific istance at various depths is obtained by lowering the measuring apparatus o a drill hole. The arrangement provides for three electrodes connected isolated cables of different lengths and lowered into the hole; one of the ee electrodes is connected with the source of current and the two others ve as probes.

Claims allowed - 2.

(962) ELEKTROMETER ZUR ERDERFORSCHUNG DURCH VERGLEICHSMESSUNG DER ELEKTRISCHEN LEITFÄHIGKEIT DER LUFT AN MEHREREN STELLEN.

(ELECTROMETER FOR EXPLORATION BY MEANS OF COMPARATIVE MEASUREMENTS OF ELECTRICAL CONDUCTIVITY OF THE AIR AT SEVERAL PLACES)

Louis Müller of Berlin-Baumschulenweg

man patent 535,556 Patent issued October 13, 1931.

The invention relates to an electrometer for exploration by means of parative measurements of electrical conductivity of the air at several ces. It is characterized by the following arrangement: Two or more lamellae, above the other, independent one from another, of the same magnetization rotatable around a vertical axis, as well as a corresponding number of ovable walls consisting of isolating material and provided with conducting ting, are arranged inside of a case in such a manner that by charging at potential, the lamallae, which originally are close to the coating and adjusted in the direction north-south, are deviated from this direction equal angles. After this the connection of the conducting coating with collectors installed at various places of the region under investigation established and the velocity of the retrograde movements of the different allae is compared.

Claims allowed - 3.

(963) VERFAHREN UND EINRICHTUNG ZUR ELEKTRISCHEN BODENFORSCHUNG MIT WECHSELSTROM NACH DER SONDENMETHODE UNTER VERWENDUNG EINES KOMPLEXEN WECHSELSTROMKOMPENSATORS

(METHOD AND ARRANGEMENT FOR ELECTRICAL PROSPECTING WITH ALTERNATING CURRENT ACCORDING TO THE PROBE-METHOD BY USING A COMPLEX ALTERNATING CURRENT COMPENSATOR

Prospector-Institut für praktische Geophysik und Geologie, Dr. Hülsenbeck and Co. of Frankfurt am Main.

German patent 536,097 Patent issued October 20, 1931.

The invention relates to a method and arrangement for electrical prospecting in which a complex alternating current compensator is used. According to the new arrangement a fixed phase length, most suitable for electrical investigations, can be imparted to the measuring current flowing through the compensator.

Claims allowed - 5.

(964) VERFAHREN UND EINRICHTUNG ZUR ELEKTRISCHEN BODENFORSCHUNG MIT WECHSELSTROM NACH DER INDUKTIONSRAHMENMETHODE UNTER VERWENDUNG EINES KOMPLEXEN WECHSELSTROMKOMPENSATORS

(METHOD AND ARRANGEMENT FOR ELECTRICAL PROSPECTING WITH ALTERNATING CURRENT ACCORDING TO THE INDUCTION FRAME METHOD BY USING A COMPLEX ALTERNATING CURRENT COMPENSATOR)

Prospector Institut für praktische Geophysik und Geologie, Dr. Hülsenbeck and Co. of Frankfurt am Main.

German patent 536,098 Patent issued October 19, 1931.

According to the new arrangement to which this invention relates, a fixed phase length, most suitable for electrical investigations, is applied to the measuring current flowing through the compensator.

Claims allowed - 5.

(965) VERFAHREN ZUR BESTIMMUNG DES KALIUMGEHALTES IM ERDREICH, IN ABLAGERUNGEN, TECHNISCHEN PRODUCTEN U. DGL.

(METHOD FOR DETERMINING THE CONTENT OF POTASSIUM IN THE EARTH, IN DEPOSITS, TECHNICAL PRODUCTS, ETC.)

Dr. Werner Kolhörster of Berlin-Friedenau.

an patent 536,006 Patent issued February 2, 1932.

The invention relates to the method for determining the content of assium in the earth, etc., by which the gamma radiation emanated by assium acts upon a measuring instrument; the ionization produced inside his measuring instrument serves for the determination of the specific tent of potassium.

Claims allowed - 2.

(966) METHOD AND APPARATUS OF PROSPECTING FOR ORE

By D. L. Gandler

sian patent 17,521 Patent issued September 30, 1930.

This invention relates to the method and apparatus of prospecting for , Conclusions on the velocity of propagation of the electromagnetic es are drawn from the amplitude of the wave reflected from the surface arating each two adjoining nonconducting layers. From this velocity of pagation the physical and chemical properties of the rocks are determined.

Claims allowed - 3.

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1. GRAVITATIONAL METHODS

(967) TERRAIN AND TOPOGRAPHICAL EFFECTS IN GRAVIMETRIC SURVEYS

By W. G. G. Cooper

The Mining Magazine, London, vol. 46, No. 5, 1932, pp. 282-285.

In this article the author suggests a method of computing terrain and topographical effects in survey work with the Eötvös torsion balance. The suggestion embodies the use of slide rule, graphical work, and planimeter, and it is claimed that the accuracy of these instruments is equal to or greater than that of the assumptions made regarding density of material, etc. Levels are taken along radial lines (8 in normal country) at any convenient distances, giving a fair representation of the ground.

The theory of the method is discussed.--W. Ayvazoglou.

(968) SURVEYS WITH THE TORSION BALANCE AND THE MAGNETOMETER IN EASTERN CANADA

By A. H. Miller

The Journal of the Royal Astronomical Society of Canada, Toronto,
vol. 26, No. 1, 1932, pp. 1-16.

The author discusses the results of the torsion balance and magnetometer surveys carried out in Ontario over the Hull-Gloucester fault at Leitrim, the Hazeldean fault, the Caldwell pyrite deposit, and the dunite intrusive at Thetford, Quebec.

The results are represented in a series of plans and diagrams.--W. Ayvazoglou.

(969) TEKTONISCHE UND GEOPHYSIKALISCHE PHÄNOMÄNE IN DER FERGHANREGION, ZENTRALASIEN

(TECTONIC AND GEOPHYSICAL PHENOMENA IN THE REGION OF FERGHANA, CENTRAL ASIA)

By Franz Kossmat

Zeitschrift der Deutschen Geologischen Gesellschaft, Berlin,
vol. 84, No. 2, 1932, pp. 84-94.

Geophysical phenomena in the region of Ferghana are discussed in Chapter IV of this article. The region is characterized by great negative gravity anomalies. A few especially typical values are given in a table. --W. Ayvazoglou.

(970) LA PROSPECTION GRAVIMETRIQUE DANS LES REGIONS PETROLIFÈRES

(GRAVIMETRICAL PROSPECTING IN THE OIL-BEARING REGIONS)

Editorial note

Le Génie Civil, Paris, vol. 100, No. 14, 1932, p. 355.

The note relates to the papers presented by Gornich and Reich during
e general meeting of the German Geological Society, held from September 14
17, 1931 (see Geophys. Abs. 34, p. 372).--W. Ayvazoglou.

2. MAGNETIC METHODS

(971) AN IMPROVED METHOD FOR THE COMPARISON OF SMALL MAGNETIC SUSCEPTIBILITIES

By R. A. Fereday

Proceeding of the Physical Society, London,
vol. 43, part 4, No. 239, 1931, pp. 383-393.

In an earlier communication (Proc. Phys. Soc., vol. 42, 1930, p. 251)
account was given of a new method, of the nonuniform field type, for the
mparison of small magnetic susceptibilities.

In this article the author continues his investigations and shows that
agnetic field, especially suitable for determination of relative suscepti-
lity by an improved nonuniform field method, can be produced by an electro-
gnet whose pole pieces are respectively plane and spherically concave.- W.
vazoglou.

(972) THE MAGNETOMETER IN ILLINOIS

By Perry S. McClure

Transactions of the Illinois State Academy of Science, Springfield,
vol. 24, No. 2, 1931, pp. 341-349.

A description is given of magnetometer surveys carried out in Eastern
linois where the geologic structure is well known. The entire survey
vers an area of 3,240 square miles. Some 1,620 magnetometer stations were
tablished in these areas to measure the relative vertical magnetic
tensity.

This report points out some of the principal anomalies of the earth's
gnetic field in Illinois as revealed by measurement of the vertical com-
nent at numerous points and describes the effect of faults on the vertical
gnetic intensity.

A discussion under the following headings is given: (1) Earth's magnetic field, (2) history of magnetic exploration, (3) magnetic field balance, (4) interpretation of magnetic anomalies, (5) magnetic anomalies in Illinois, and (6) tracing faults with the magnetometer.

The author concludes that the magnetometer has two principal uses in Illinois. First, in regional reconnaissance surveys it is quite possible to pick up structural trends, and second, in doing detailed work it will indicate the position of faults.

(973) CATALOGUE OF MAGNETIC DETERMINATIONS IN THE U.S.S.R. AND IN ADJACENT COUNTRIES FROM 1556 TO 1926

By B. P. Weinberg

Issued by the Central Geophysical Observatory in Leningrad,
1932, pp. 216-297.

This is the second part of the catalogue issued by the Central Geophysical Observatory in Leningrad (see Geophys. Abs. 11).

The catalogue is supplemented by three charts reduced to the epoch 1925:

1. Chart of isogamic lines.
2. Chart of isoclinal lines.
3. Chart of isodynamic lines.

Explanations to the charts are given in the Russian and English languages.--W. Ayvazoglou.

(974) PRELIMINARY SUMMARY OF DATA ON THE PRESENT DISTRIBUTION OF MAGNETIC DECLINATION WITHIN THE ARCTIC ZONE

By Boris P. Weinberg

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 36, No. 4, 1931, pp. 273-278.

Owing to the fact that the determinations of the magnetic elements in the arctic regions are irregularly distributed over the territory, as well as in time, so that it is difficult to find their distribution for a definite epoch in a sufficiently trustworthy manner, the author tries to solve this problem by using the method of successive approximations relating to an element [illegible] and to its secular variation (annual change) [illegible].

The method summarized in this article has been developed as the results of Weinberg's experience in reducing to 1925 all the magnetic determinations in the U.S.S.R. and adjacent countries. Data on the distribution of magnetic declination within the arctic zone is summarized in figures and a table.--W. Ayvazoglou.

(975) TERRESTRIAL-MAGNETIC ACTIVITY AND ITS RELATION TO SOLAR PHENOMENA

By J. Bartels

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 37, No. 1, March, 1932, pp. 1-52.

A homogeneous series of monthly means of terrestrial-magnetic activity r the years 1872 to 1930 is derived and extended backward, in annual means, 1835. The annual variation of magnetic activity and of the relative sun- ot numbers is discussed by means of new tests for periods. Only the semi nual wave in magnetic activity is recognized as physically significant. s maxima prefer the times when the sun is in the celestial equator, and t, as has been suggested, the times when the sun's axis is most inclined ward the ecliptic. This view is supported by tests using the harmonic dial l the probable-error circle, and by several independent considerations.

The close relations between sun-spot numbers and terrestrial-magnetic tivity in the annual and monthly means are discussed. Some general statis- cal aspects are given for the treatment of the correlation between such ries with after effects, for which both solar activity and terrestrial- gnetic activity are typical. The homogeneity of the whole available series r relative sun-spot numbers and for areas of sun-spots and faculae is tested; ne inhomogeneities are found, apart from a general lag of terrestrial- gnetic activity that has occurred in some sun-spot-cycles. A break in the mogeneity of the international magnetic character figures in recent years discovered.

The individual 27-day recurrences in terrestrial-magnetic activity dur- g 1906-1931, and their relations to solar activity are discussed with the lp of a graphical day-by-day record. They indicate the existence of per- stent activity areas on the sun's surface, called M regions, which, in ny cases, can not be coordinated to such solar phenomena as are observable direct astrophysical methods. This holds in particular for the new solar lices which are available for the years 1928-1930, and which are found so osely correlated to sun-spot numbers, that they fail to improve the corre- tion between solar activity and terrestrial-magnetic activity. Observations terrestrial-magnetic activity yield therefore not only information about ophysical influences of such solar phenomena that may be traced in astro- ysical observations, but supplement these direct observations themselves-- thor's abstract.

(976) ZAMERENI A VYPOCET MAGNETICKE DEKLINACE (IN BOHEMIAN)

(OBSERVATION AND CALCULATION OF MAGNETIC DECLINATION)

By Fr. Cechura

Hornicky Vestnik (Mining Journal), Prague, 1931, pp. 1-18.

After a brief introduction in which the author indicates the practical importance of knowing the correct magnetic declination, a description of the Schmidt and Neumayer mirror-declinometer and of Hildebrand's magnetic theodolite is given.

The process of measurements is discussed. Checking of the results in order to avoid errors in calculations is explained.--W. Ayvazoglou.

(977) A TYPICAL CASE OF VARIABILITY OF QUIET-DAY DIURNAL VARIATION IN TERRESTRIAL MAGNETISM AND EARTH CURRENTS AT WATHEROO

By J. Bartels and W. J. Rooney

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 37, No. 1, March, 1932, pp. 53-55.

The small magnetic diurnal variation recorded at the Watheroo Observatory, Watheroo, Western Australia, on two successive magnetically very quiet days, February 3 and 4, 1929, was noteworthy. This case is discussed as typical for the variability of the quiet-day diurnal variation. A significant parallelism is found with the diurnal variation of earth currents.--Authors' abstract.

(978) TEST-DEFLECTIONS FOR VARIOMETERS AND MAGNETOGRAPHS

By George Hartnell

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 37, No. 1, March, 1932, pp. 63-78.

This is the continuation of the article published under the same title in "Terrestrial Magnetism and Atmospheric Electricity, vol. 36, No. 4, 1931, pp. 279-296. Author's abstract of the article is given in Geophysical Abstracts 37, May, 1932, p. 442.--W. Ayvazoglou.

(979). THE AGINCOURT SCHUSTER-SMITH COIL-MAGNETOMETER

By W. E. W. Jackson

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 37, No. 1, March, 1932, pp. 79-82.

In this article the author describes the function of a Schuster-Smith oil-magnetometer installed in August, 1931, in the magnetic observatory at gincourt.

The principle of the instrument is given briefly.

A table shows the results of observations made on August 12, 1931, and he results of comparison with the magnetograph, the values of which are educed from observations with Elliott magnetometer No. 98 reduced to the nternational Magnetic Standard of the Department of Terrestrial Magnetism f the Carnegie Institution.--W. Ayvazoglou.

(980) MAGNETIC CONVERGENCE MAPPING

By W. I. Ingham

The Mines Magazine, Golden, Colorado, vol. 22, No. 7, 1932, pp. 7-8.

This paper deals with a method of mapping and interpretation used by he writer in some areas in Texas, while making magnetic surveys with the chmidt vertical-intensity magnetometer.

Preparation of the magnetic convergence maps is explained.--W. Ayvazoglou.

981) (THEORY AND EXPERIMENTS CONCERNING A NEW COMPENSATED MAGNETOMETER SYSTEM

By C. A. Heiland and W. E. Pugh

The American Institute of Mining and Metallurgical Engineers,
Technical Publication 483,
1932, 42 pp.

Heiland's summary of the paper reads as follows:

> The angle of deflection in magnetic-intensity variometers indicates a balance between the magnetic force component to be measured and another known force, which is either (1) of a magnetic or (2) of a mechanical nature (torsion of wires, gravity moment). Only in the first case can the influence of temperature be avoided, as the temperature coefficient of the needle cancels; in the second case, a compensation for temperature is possible, as its magnetic effect can be partly neutralized by an opposing "mechanical" effect. Although the magnetic effect is usually reduced as much as possible by using

systems of great moment, as a rule it remains greater than the mechanical effect. Then additional compensation is required, which may be of a magnetic (auxiliary magnet) or of a mechanical nature (temperature affecting torsion of suspensions or the position of the center of gravity, etc.) In vertical magnetometers, the last type of compensation is used mostly. In the old type of Schmidt balance it was accomplished by shifting the blades; in the new system, by suitably arranged temperature and latitude spindles.

The theory of the temperature effect on a magnetic system is given in two parts. First, the magnetic temperature coefficient only is considered, in its effect on scale value and reading. The magnetic T.C. of the scale value is negligible ($=\mu\varepsilon$), μ being the temperature coefficient of the magnetic moment. The magnetic T.C. of the reading is very large (T.C. = $-\mu Z$), proving that the T.C. depends on the latitude.

Second, the combined "mechanical" and "magnetic" effects are discussed. For the T.C. of the scale value: T.C. = $(\delta+\mu)\ \varepsilon$, δ being the expansion coefficient of steel, the T.C. of the scale value is again negligible. For the temperature coefficient of the reading, T.C. = $-Z_0\ (p+\mu)$, Z_0 being the vertical intensity for which the system is adjusted, p representing the "mechanical" temperature coefficient; it may be made negative and equal to μ by a suitable arrangement of the masses in the system.

There is an influence of latitude upon a compensated system, as Zo remains practically constant, but $-Z\mu$ changes. The temperature coefficient, therefore, increases with an approach of the equator. The change is not very great; a system compensated for Golden may be used without readjustment practically throughout the United States.

If the T.C. is expressed in gammas, changes in scale value should not affect it; however, there may be such an influence, if a change in the ε-screw changes the lateral position of the center of gravity. In the magnetic system investigated, the T.C. increases with scale value; the increase is small for high, great for low magnetic latitudes; yet, in both cases close to the observational error. The theory shows also that, if the T.C. is not determined near the reading 20, the deflection of the system enters, as it changes Z; however, the influence is small.

Computations of T.C. based upon the theory as outlined have been checked by the experiments with an accuracy of ± 0.3 γ and less.

The proposed experimental work required a number of preliminary investigations, such as the determination of the magnetic moment of the system and of its temperature coefficient, investigations into the most suitable procedures for changing temperatures, scale values, and latitudes. It was found that the simultaneous recording of the magnetic variations was required, which in turn necessitated a fairly constant temperature in the recording room. For the accurate determinations of temperature coefficients, arrangements had to be made to use always the same temperature gradient in order to obtain comparable values for different scale values and latitudes. The amount of lag of the reading behind the recorded temperature was accurately determined for the gradients employed.

Numerous temperature curves were recorded for normal conditions at Golden, for different latitudes varying between vertical intensities near the magnetic equator and intensities exceeding Z at the pole, and, finally, for different scale values.

The results are shown graphically, and are in close accord with the theoretical deductions. They show a decrease of the temperature coefficient with increase in latitude.

It is concluded that the new magnetic system gives reliable results for a great variety of latitude, scale value, and temperature conditions. The derivation of the complete theory makes it possible to determine accurately the influence of any changes in these factors upon the T.C., and to calculate the change in T.C. for any changes in the distribution of the masses of a magnetic system.--C. A. Heiland.

3. SEISMIC METHODS

982) ON THE VELOCITY OF THE P-WAVE, WITH SPECIAL REFERENCE TO THE DISCONTINUITY RECENTLY SUGGESTED BY DR. H. JEFFREYS

By Hiroshi Kawasumi

Japanese Journal of Astronomy and Geophysics, Tokyo, vol. 9, No. 1, 1931, pp. 15-22.

The velocity of the P wave in the substratum up to the Wiechert discon-
uity was re-estimated by assuming the Rudski-Wiechert formula $v = a - br^2$,
ng the mean travel times of 85 earthquakes recently obtained by H.
freys. The depth of the Wiechert discontinuity was also determined. The
ults coincided within almost 1 per cent with the previous determination
the author from a near earthquake, and the general accuracy has increased.
s good coincidence and the smallness of the residuals show that the velocity
mula above determined is sufficient for the present so far as it concerns
accuracy of determining the travel time. The depth of the Wiechert dis-
tinuity came out very near that of previous determination. Some light has
n thrown on the smallness of the focal depth of large earthquakes of normal
gins.--Author's abstract.

(983) CHARACTERISTICS OF THE OSCILLOGRAPH GALVONOMETER: SOME PRACTICAL CONSIDERATIONS IN THE DESIGN AND APPLICATION OF THE OSCILLOGRAPH-GALVANOMETER VIBRATOR

By V. S. Thomander

Journal of the Franklin Institute, Philadelphia,
vol. 213, No. 1, 1932, pp. 41-55.

The paper describes the mechanical characteristics of the vibrator for any periodic phenomena, so that the mechanical error due to the vibrator may be eliminated from the oscillogram and the true phenomena determined. The paper establishes the best damping to use, when considered from the standpoint of vibrator response, lag, and transient characteristics. There is a method given to determine the vibrator resonance and damping, that may easily be applied in the field. Curves, from which all the above-mentioned may be obtained, are supplied.--Author's abstract.

(984) A SIMPLE SUSPENDED MIRROR SEISMOGRAPH

By Benjamin Allen Wooten

Science, New York, vol. 75, No. 1932, 1932, pp. 82-83.

The apparatus consists essentially of a light mirror about 3 mm in diameter hung by means of two silk fibers in an F frame after the manner of Darwin. The motion of the mirror is traced on a photographic film, which is attached to a rotating drum in the usual manner.

The apparatus has been used thus far in the study of earth tremors and disturbances of a minor nature. It detects with ease the footsteps of a person 100 yards from the building. It records the passing of a street car or an automobile half a mile away. According to the author this apparatus is particularly well adapted to the study of tremors which do not penetrate the earth very deeply. It is light, simple, inexpensive, and easily portable; and it can be set up with a minimum of adjustment.--W. Ayvazoglou.

(985) A NEW VERTICAL SEISMOGRAPH

By Hugo Benioff

Bulletin of the Seismological Society of America, Stanford University, Calif.,
vol. 22, No. 2, 1932, pp. 155-169.

The vertical seismograph described in this paper makes use of a mechanical system of short period in combination with an electromechanical "transducer" of high sensitivity coupled to a recording galvanometer. (According to the footnote an electromechanical transducer is a device actuated by power from a mechanical system and supplying power to an electrical system, or vice versa.) In the Galitzin seismograph the transducer consists of a l which moves in a magnetic field in such a manner as to generate electro- ive force proportional to the velocity of the inertia reactor. The present nsducer embodies a modification of the common telephone-receiver principle l is also of the velocity type.

The mechanical system of the seismograph is described and the theories the electromechanical transducer and of the seismograph are given.--W. yazoglou.

(986) REFLECTION METHOD IN SEISMIC PROSPECTING

By H. M. Rutherford

The American Institute of Mining and Metallurgical Engineers, New York,
Technical Publication 486, 1932, 22 pp.

The purpose of the present paper is to present the method of reflections the mapping of geologic structure and also to give some indications of its nitations.

The problems connected with the reflection method are summarized by the hor in part as:

1. General design of instruments.
2. Identification of the reflection on the seismogram.
3. The correlation of the reflection with the reflecting bed.
4. Methods of computation.

The relationship between the time-distance curve for refracted waves and at for reflected waves is developed. General formula for reflections is rived. A discussion is given on the (1) path of reflected ray in case of veral beds, (2) the average velocity, (3) the surface (or weathering) cor- tion, (4) reduction to mean datum, and (5) curved paths.

The last part of the article deals with the examples of reflections as wn in graphs and tables.

The author concludes:

> It is pertinent to point out that seismic methods of prospecting have not reached, and may never reach, a stage where the calculations are merely a matter of routine. Geological conditions are not the same all over the country. They vary considerably even in any one region. Methods that might give close approximations to true conditions in one territory may be found to give very great errors if used in another.
>
> In general, the results presented in this paper are the outgrowth of several years of experience in seismic prospecting. Much work remains to be done, both experimentally and in methods of interpretation of data.--W. Ayvazoglou.

(987) POSSIBILITY OF FREE OSCILLATIONS OF STRATA EXCITED BY SEISMIC WAVES

By K. Sezawa and K. Kanai

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 2, 1932, pp. 273-298.

The present paper continues as a report of the authors' research work to determine the possible range of free oscillations of strata due to a seismic disturbance (see Geophys. Abs. 38, p. 477). This paper deals with a case where primary seismic waves are incident upwards normally to twofold stratified layers resting on the surface of a semi-infinite body.

Thicknesses, densities, and elastic constants of the two layers and of the bottom medium, obtained from the results of investigations made by Matuzawa and Imamura, and used by the authors for their mathematical discussion, are as follows:

Layer	Thickness	Density	V for P waves	V for S waves
Upper layer (granite)	H'-H = 20 km	$\rho'' = 2.7$	5.0 km/sec.	3.15 km/sec
Second layer (basaltic)	H = 30 km	$\rho' = 3.0$	6.1 km/sec.	3.70 km/sec
Bottom medium (ultrabasis)	∞	$\rho = 3.5$	7.5 km/sec.	4.45 km/sec

A few numerical examples are shown in figures.--W. Ayvazoglou.

(988) AMPLITUDES OF P AND S WAVES AT DIFFERENT FOCAL DISTANCES

By K. Sezawa and K. Kanai

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 2, 1932, pp. 299-335.

This paper is concerned with P and S waves of equal periods generated from a point in a visco-elastic body and transmitted in all directions toward infinity. To determine the amplitudes of the waves in all probable cases, the authors considered the generation of the waves in a certain distribution in different azimuths as well as different latitudes.

From the results of their theoretical investigations, the authors conclude that, at any rate, the abnormal smallness of the amplitudes of P waves can not be ascertained directly from the nature of the wave propagation.--W. Ayvazoglou.

89) ON THE EXPRESSIONS OF THE DEFORMATION OF A SEMI-INFINITE ELASTIC BODY DUE TO THE TEMPERATURE VARIATION.

By G. Nishimura

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 2, 1932, pp. 335-351.

Nishimura's investigations presented in this article are closely con-
cted with those published by him in the Bulletin of the Earthquake Research
stitute, vol. 8, No. 2, 1930, pp. 91-143, under the title "The effect of
mperature distribution on the deformation of a semi-infinite elastic body."
ee Geophys. Abs. 17, p. 20.)

Nishimura studied the deformation of the solid due to temperature dis-
ibution and variation satisfying all the conditions of the theory of heat
nduction.

The two following cases were examined: The case where the inertia of
lid was neglected, and that where the inertia effect was taken into account.
both cases the resulting equations contained the term of density, in spite
the fact that the inertia term was neglected in one case and not in the
ner.--W. Ayvazoglou.

(990) INVESTIGATION ON THE DEFORMATION OF THE EARTH'S CRUST IN THE TANGO DISTRICT INCIDENT TO THE TANGO EARTHQUAKE OF 1927

By Chūji Tsuboi

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 2, 1932, pp. 411-435.

Previous investigations of the deformation of the earth's crust in the
ngo district brought about by the Tango earthquake of 1927 have been made
the author (see Geophys. Abs. 18 and 34). In this article Tsuboi con-
ues his investigation and discusses the results of the last precise level-
gs carried out by the Land Survey Department of the Imperial Army.--W.
vazoglou.

991) INVESTIGATION OF THE DEFORMATION OF THE EARTH'S CRUST IN IDU PENINSULA CONNECTED WITH THE IDU EARTHQUAKE OF NOVEMBER 26, 1930

By Chūji Tsuboi

Bulletin of the Earthquake Research Institute, Tokyo,
vol. 10, No. 2, 1932, pp. 335-352.

In his previous paper (Bulletin, Earthquake Research Institute, Tokyo,
l. 9, 1931, p. 271) Tsuboi compares the old and new precise levelings made

around the peninsula and discussed the results. In the present paper he discusses the differences between the old and new triangulation over the area. The movement of each triangulation point is established. The deformation of the earth's crust is investigated on the basis of the results.--W. Ayvazoglou.

(992) SEISMOMETRICAL REPORT

By N. Nasu and Ch. Yasuda

Bulletin of the Earthquake Research Institute, Tokyo;
vol. 10, No. 2, 1932, pp. 492-498.

The report gives:

1. Sensible earthquakes in Tokyo for the period October 1 to December 31, 1931.
2. Important distant earthquakes as observed in Tokyo.
3. A map of distribution of the earthquakes that originated within a distance of 160 kilometers from Tokyo.

For previous report see Geophysical Abstracts 34.--W. Ayvazoglou.

(993) TWO-COMPONENT VIBROGRAPH

American Askania Corporation

Instruments, Pittsburgh, Pa., vol. 5, No. 1, 1932, p. 21.

A special feature of this instrument, designed for the study of mechanical vibrations, is that the vibrations are converted into visible wave forms by a mechanical optical arrangement, rather than by use of a cathode-ray oscillograph.

To determine the extent and direction of the vibrations, the movement of the ground is broken up into its three spatial components. The three pendulum weights in the instrument are therefore so arranged that they are affected only by forces acting in one of three directions at right angles to each other.--W. Ayvazoglou.

(994) TRI-DIMENSIONAL VIBROGRAPH

By the Vibration Specialty Co.

Instruments, Pittsburgh, Pa., vol. 5, No. 5, 1932, p. 136.

The vibrograph is a form of seismograph which indicates and records components of vibration simultaneously in a vertical and two horizontal rections. The instrument comprises a heavy cubic mass suspended in a ame by a system of springs, and means for indicating and recording rela- ve motion between the mass and the frame. When placed upon any vibrating dy the frame vibrates with the body while the mass due to its inertia nds to remain at rest.--W. Ayvazoglou.

(995) THE JAPANESE EARTHQUAKE OF MARCH 29, 1928, AND THE PROBLEM OF DEPTH OF FOCUS

By V. C. Stechschulte

Bulletin of the Seismological Society of America, Stanford University, California, vol. 22, No. 2, 1932, pp. 81-137.

A detailed investigation of the Japanese earthquake of March 29, 1928, which Wadati, on the basis of the S-P intervals at the Japanese stations, l assigned great focal depth, has been made in order to see if the records all distances show the expected effects of that depth.

1. The S-P, P, and S travel-time curves show systematic, graduated partures from the "average" curves.

2. These same curves have an inflection point in the vicinity of = 10°.5.

3. The two pairs of singly reflected waves, pP and PR, sS and SR, were cognized, and tables of observed travel times for the pP and sS waves are re presented for the first time.

4. Tables of travel times for other phases, P^1, S_cS, S_cP_cS, $S_cP_cP_cS$, re drawn up and compared with the times given in the Macelwane tables.

The evidence drawn from the foregoing is all consistent in pointing to traordinary depth of focus. To obtain a numerical evaluation of that depth, new method was devised utilizing the travel-time curves for pP and P. The pth was thus calculated as 410 ± 30 kilometers. This same method also sup- ied means for deriving the time of occurrence and for improving the approx- ate location of the epicenter.

The coordinates of the epicenter are: 31° 45' N., 138° 12' E.

The time of occurrence was determined as $5^h\ 06^m\ 03^s$ G.M.T., March 29, 28.

Further check on the focal depth of 410 milometers is afforded by the educed" travel times which have been calculated from the data of the present thquake, and which are found to agree very satisfactorily with the times shocks at or near the surface as given by various workers.

An alphabetical list of the Japanese stations, together with the arrival times of P and the S-P intervals as given by Wadati (On shallow and deep earthquakes: Geophys. Mag., Tokyo, vols. 1 and 2, 1929), is presented. This is followed by a list of the other stations from which data were available. Bibliography is added.--Author's abstract.

(996) THE EARTHQUAKE IN SANTA MONICA BAY, CALIFORNIA, ON AUGUST 30, 1930

By B. Gutenberg, C. F. Richter, and H. O. Wood

Bulletin of the Seismological Society of American, Stanford University,
California, vol. 22, No. 2, 1932, pp. 138-154.

The occurrence of a moderately strong local earthquake in Santa Monica Bay, Calif., on August 30, 1930, is discussed and its epicenter and origin-time determined as follows: $\phi = 33^\circ 57'$ N., $\lambda = 118^\circ 38'$ W., $O = 4 : 40 : 36.0$ p.m., P.S.T. ($0^h 40^m 36^s.0$, G.C.T., August 31, 1930).

The maximum intensity observed was VIII of the Modified Mercalli Intensit Scale of 1931, and the shock was perceptible at distances up to about 160 kilometers (100 miles) from the epicenter. The distribution of apparent intensity exhibits numerous irregularities which are discussed in the text.

The depth of origin can not be determined accurately, but the data are consistent with a depth of 10 to 15 kilometers (6 to 9 miles). A significantl greater depth is not consistent with the data.

The surface and subsurface geology of the region are discussed briefly.--Authors' abstract.

(997) TRENDS IN GEOPHYSICAL PROSPECTING WITH EXPLOSIVES

By Roland F. Beers

The Explosive Engineer, Wilmington, vol. 9, No. 8, 1931, pp. 288-289.

In selecting explosives for use in seismic prospecting, the author examines important characteristics such as strength, density, rate of detonatio water resistance, consistency, resistance to freezing, safety, and cost per unit of explosive energy.

The efficiency of personnel used in seismic prospecting is emphasized.--W Ayvazoglou.

4. ELECTRICAL METHODS

(998) GEOPHYSICAL PROSPECTING. NEW SCHLUMBERGER METHOD

By A. Montgomery

Industrial Australian and Mining Standard, Melbourne,
vol. 87, No. 2231, 1932, p. 144.

In this article Montgomery discusses the new electrical method of xamining ground passed through by boreholes, as described by C. and M. chlumberger and E. Leonardon in Technical Publication 462 of the American nstitute of Mining and Metallurgical Engineers (see Geophys. Abs. 35, p. 92).--W. Ayvazoglou.

(999) ELECTRICAL PROSPECTING IN CANADA

By J. J. Breusse

ngineering and Mining Journal, New York, vol. 133, No. 6, 1932, pp. 337-338.

The purpose of this paper is to illustrate, by two examples of practical urveys, the use of the self-potential method in ore exploration.

The author discusses briefly the conditions under which the phenomenon f spontaneous polarization occurs, and the reasons why it is one of the most eliable and rapid techniques in the explorations for ore.

The electrical surveys of the F orebody of the Amulet Mines, in the Rouyn istrict of Quebec, and of the Brunschwig orebody near Hope, B. C., were xamined.

In both cases the electrical conclusions agreed satisfactorily with the eological information.--W. Ayvazoglou.

(1000) EARTH RESISTIVITY SURVEY IN ILLINOIS

By M. King Hubbert

gineering and Mining Journal, New York, vol. 133, No. 3, 1932, pp. 142-143.

Three types of problems were investigated by the earth-resistivity thods specified: (1) Faults in Paleozoic sediments, (2) gravel deposits d ground-water supply in glacial drift, and (3) anticlines buried beneath ift.

Apparatus used was the megger ground tester.

It was found that faults could be discovered, especially if the outcrops on the opposite side were different or if a considerable shear zone were associated with the fault plane. Major gravel deposits having fairly sharp boundaries could be detected readily because of their relatively higher specific resistivity. Moreover, the one buried anticline tested gave a pronounced anomaly, which coincided with the anticlinal axis as independently determined from well-log data. Attempts at precise depth determinations have not as yet been successful.--W. Ayvazoglou.

(1001) OBSERVATION AND DEDUCTION APPLICABLE TO MEASUREMENT OF ELECTRICAL RESISTIVITY OF LARGE VOLUMES OF EARTH IN PLACE

By Carl Henry Knaebel

Bulletin of the Michigan College of Mining and Technology, Houghton,
vol. 5, No. 2, January, 1932, 31 pp.

In this paper Knaebel discusses and developes mathematically the solutions for some of the simpler problems involved in that type of electrical prospecting known as the "surface potential method." The number of such problems is of course great, and the author expresses the hope that the results for those treated in this thesis will be of interest to the engineer and that the methods of attack explained here will aid the student of geophysics in solving many of the more difficult problems.

The solution of problems of current distribution and current flow in infinite conductors can, according to the author, seldom be found in treatises on current electricity, which deal chiefly with electrical machines and circuits. Thus in the present work Knaebel found it necessary to resort to the study of similar problems in the theory of electrostatics and then to transfer the solutions bodily to the current-flow problems.

The headings of the article are as follows:

Distribution of current in an infinite homogeneous medium.
Distribution of potential in an infinite homogeneous medium.
Potential distribution in the case of two layers.
Interpretation of field data.--W. Ayvazoglou.

(1002) GEOPHYSICAL PROSPECTING METHODS

Editorial note

The Miner, Vancouver, vol. 5, No. 7, 1932, pp. 213-214

This paper summarizes E. G. Leonardon's address on Schlumberger's thods of prospection, according to the following outline:

1. Exploration for conductive orebodies.
2. Stratigraphical and tectonical studies.
3. Dam site studies; mapping of buried valleys.
4. Measurements of resistivities in drill holes; electrical correlations.
5. Preliminary discussion of problems, examination of field data, test surveys.

The address was concluded by discussing the electrical measurement of sistivity and porosity inside of open drill holes by an insulated cable wered in the hole to obtain the electrical characteristics of the rocks situ.—W. Ayvazoglou.

5. RADIOACTIVE METHODS

(1003) ÜBER DEN LUFTDRUCKKOEFFICIENTEN DER HARTEN ULTRASTRAHLUNG

(ON THE AIR-PRESSURE COEFFICIENT OF HARD COSMIC RADIATION)

By W. Messerschmidt and W. S. Pforte

Zeitschrift für Physik, Berlin, vol. 73, No. 9/10, 1932, pp. 677-680.

The mean value of the air-pressure coefficient of hard cosmic radiation rotected from all sides by 10 cm thick lead plates) was found to be very nstant during a period of measurements of half a year; the same was found r the intensity of radiation reduced to the height of the barometer equal 750 mm Hg. During low barometric pressures of short duration, deviations om the mean air-pressure coefficient were observed.--Authors' abstract anslated by W. Ayvazoglou.

(1004) COSMIC-RAY IONIZATION AND ELECTROSCOPE-CONSTANTS AS A FUNCTION OF PRESSURE

By Robert A. Millikan

The Physical Review, Minneapolis, vol. 39, No. 3, 1932, pp. 397-403.

1. The residual ionization in an electroscope at infinite depth in water, at is, its zero reading, is found to be an inverse function of the pressure. us, in a particular electroscope the zero at 1 atmosphere was 5.13 ions ^{3}/sec., while at 30.1 it had fallen to 1.2 ions cm^3/sec.

2. Also, when in this electroscope the pressure was changed from 1 atmosphere to 30.1 atmospheres the observed ionization current rose but 13.80-fold, which multiplying factor was found to be the same for gamma rays and for cosmic rays.

3. Both of these pressure effects are shown to be due to lack of saturation in high-pressure electroscopes, as first explained in Nature of October 3, 1931, by Bowen and the author.

4. From the multiplying factor found in (2) in the measured ionization at Pasadena in this 30-atmosphere, high-pressure electroscope, the number of cosmic-ray ions at 1 atmosphere (24° C., 74 cm pressure) in this electroscope at Pasadena is found to be fairly accurately 2.63 ions cm^3/sec.

5. The sea-level value of the ionization in this electroscope is 2.48 ions cm^3/sec.--Author's abstract.

6. GEOTHERMAL METHODS.

(1005) RECENT GEOTHERMAL MEASUREMENTS IN THE MICHIGAN COPPER DISTRICT

By James Fischer, L. R. Ingersoll, and Harry Vivian

The American Institute of Mining and Metallurgical Engineers, New York,
Technical Publication No. 481, 1932, 11 pp.

Considerations of heat conduction guided the measurements made to determine the actual virgin temperatures at the "temperature stations." Holes in which were inserted one or more thermometers, were drilled a few inches back from the breast. Mercury-in-glass thermometers were chosen, mainly because of their simplicity and reliability. Two, and sometimes three, thermometers were inserted in these holes, and were read at 2-hour intervals until three or four readings had been taken. This proceeding was repeated over a number of days. It was found that reliable readings were obtained without waiting until some days after drilling and in spite of nearby blasting.

The conclusions drawn by the authors read as follows: Temperature measurements in eight special drill holes in the Calumet and Hecla mines, together with one in an old hole which has suffered no appreciable temperature change in 10 years, all fall very nearly on a straight line. The temperatures range from 74.75° F. at 3,562 feet below the surface to 95.31° at 5,679 feet. When taken in connection with Lane's value of 43° for the mean surface temperature, these give an average temperature gradient of 1° F. in 108.5 feet, or 1° C. in 59.5 meters, which is only about one-half the Kelvin average for the whole earth (1° in 27.76 meters). The gradient at an average depth of 4,500 feet is 1° F. in 103.1 feet.

The data are not sufficient as yet to allow any positive conclusions as to the time and extent of the glacial epochs, but point strongly to a value at least as large as 30,000 years as the time which has elapsed since the last epoch.--W. Ayvazoglou.

(1006) MATHEMATICAL THEORY OF HEAT FLOW IN THE EARTH'S CRUST

By David Otto Ehrenburg

University of Colorado Bulletin, Boulder, vol. 32, No. 12, May, 1932.
The University of Colorado Studies, vol. 19, No. 3, 1932, pp. 327-355.

In the introduction to the mathematical discussion of the theory of heat low in the earth's crust given in this article, the author refers to Inger- oll and Zobel's application to physical geology of the mathematical theory f heat conduction in homogeneous media, and calculation by them of a number f curves for the cooling of lavas and laccoliths. Ehrenburg continues:

> Unfortunately, their results are based on the narrowing assumption that the thermal constants of the cooling mass are identical with the constants of the underlying or surrounding rock. However, the shape of a cooling curve depends not only upon the configuration of the bodies between which the heat transfer occurs and their initial temperature difference, but also upon the relative values of conductivity, density, and specific heat. The writer believes that the difference in thermal constants is an important factor in modifying the character of a temperature curve; and in this paper is proposed a new method of treating the flow of heat in two heterogeneous solids in contact, and also is demonstrated its application to several particular cases similar to those treated by Ingersoll and Zobel.--W. Ayvazoglou.

(1007) TEMPERATURE OF ORE FORMATION

Editorial note

The Mining Magazine, London, vol. 47, No. 5, 1932, pp. 315-317.

This is an abstract of H. C. Boydell's article published in the Bulletin f the Institution of Mining and Metallurgy for April and May, 1932, Nos. 331 nd 332, under the title, "Temperature of an epithermal ore deposit," the xample investigated being the Camp Bird Mine at Silverton, Colo. (See Geophys. bs. 40.)--W. Ayvazoglou.

(1008) RATE OF TEMPERATURE CHANGE

Editorial note

The Oil and Gas Journal, Tulsa, vol. 31, No. 3, 1932, p. 109.

In this article temperature gradients for a series of measurements are numerated: In certain wells in Pennsylvania the temperature gradient indi- ated an increase of 1° F. for each 58 to 64 feet of depth, and in California increase of 1° for each 52 feet is often observed. Other temperature in- estigations show that in some districts the temperature rises at an even aster rate, often at 1° for each 40 feet.

In the Salt Creek field of Wyoming well temperatures at a depth of 100 feet ranged from 51.4 to 65.27° F., and at 2,000 feet they ran from 79° to 98.4°. Temperature measurements in a well in the Teapot Dome field, Wyoming, showed 71.6° at 1,000 feet and 125° at 2,867 feet. In another well in the same field the temperature at 25 feet was found to be 76°, but at 2,790 feet it was 124.5°. A completely dry well in the Teapot Dome field showed a temperature of 52° at 100 feet and of 101° at 2,000 feet. In wells in California the temperature at 4,000 feet varied between 150° and 170°. A thermometer run to the bottom of a well 4,500 feet deep in the Wellington-Fort Collins area of Colorado recorded 157°.. This was 3° higher than that registered by a well 7,900 feet deep near Kane, Pa.

Temperature measurements made by E. M. Hawtoff, of the Bureau of Economic Geology, in a well in the Big Lake field in Reagan County, Tex., showed the following temperatures at depths below 5,000 feet: At 5,700 feet, 122° F.; 6,500 feet, 135; 7,000 feet, 152; 8,000 feet, 161; 8,300 feet, 170.--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(1009) SCIENCE AND PRINCIPLES OF GEOPHYSICS

By C. A. Heiland

Engineering and Mining Journal, New York, vol. 133, No. 5, 1932, pp. 286-288.

In this article Heiland gives a review of Volumes I, II, and VI of B. Gutenberg's "Handbuch der Geophysik." Sections of the Handbuch der Geophysik appeared previously were reviewed by Heiland in the January, 1932, issue. Contents of the volumes were given in Geophysical Abstracts Nos. 12, 33, and 34.--W. Ayvazoglou.

(1010) SOME OBSERVATIONS OF THE BEHAVIOR OF EARTH CURRENTS AND THEIR CORRELATION WITH MAGNETIC DISTURBANCES AND RADIO TRANSMISSION

By Isabel S. Bemis

Proceedings of the Institute of Radio Engineers, New York,
vol. 19, No. 11, 1931, pp. 1931-1947.

This paper presents correlations between the abnormal earth currents noted during magnetic storms and transoceanic radio transmission on both long and short waves. The radio transmission data were collected on the telephone circuits operating between New York and London and between New York and Buenos Aires. The earth-current data were collected on two Bell System lines extending approximately a hundred miles north and west from New York. The results of this work establish facts which have been known in a general way for some time.

The direction of flow of abnormal earth currents in the neighborhood f New York seems to be along a northwest-southeast line. Coincident with uch abnormal currents are periods of poor short-wave radio transmission. owever, on long waves, daylight transmission over transatlantic distances s improved. On the short-wave circuit to Buenos Aires, transmission is dversely affected but only to a moderate extent.--Author's abstract.

(1011) THE OPERATING FREQUENCY OF REGENERATIVE OSCILLATORY SYSTEMS

By Hugo Benioff

Proceedings of the Institute of Radio Engineers, New York,
vol. 19, No. 7, 1931, pp. 1274-1277.

The operative frequency of regenerative oscillatory systems is quanti- atively derived in terms of the natural frequency, the damping constant, nd the phase of the driving force. As an example the results are used to alculate the change in rate of a pendulum clock due to a given variation n the phase of the driving impulses. Applications to other types of sys- ems are briefly indicated.--Author's abstract.

(1012) GEOPHYSICAL SURVEYS

Editorial note

Oil News, London, vol. 31, No. 1016, 1932, p. 435.

According to this note, the first geophysical surveys of Trinidad, carried ut by the United British Oil-fields of Trinidad, yielded interesting results. hose obtained from Eötvös balance measurements made in the southwest corner f the island are still being worked out in Europe and will be available hortly.

Magnetometer and seismic surveys have been undertaken of the area between he Pitch Lake and Aripero, but the results, if anything, tend to give an nfavorable impression of oil prospects in the area. Both surveys indicate large fault with a throw of 900 to 2,100 feet running to the south of the agoon. In order to get readings from the harder or high velocity beds in he seismic survey, heavy shots of 1,000 pounds of dynamite had to be fired 3 o 4 kilometers out on both sides of the fault line.--W. Ayvazoglou.

(1013) LA GÉOPHYSIQUE APPLIQUÉE À LA PROSPECTION

(GEOPHYSICS APPLIED TO PROSPECTING)

Editorial note

Le Génie Civil, Paris, vol. 100, No. 4, 1932, p. 102.

The use of gravimetric, magnetic, seismic, and electrical methods of rospecting is mentioned briefly.--W. Ayvazoglou.

(1014) LES METHODES SÉISMIQUES ET GRAVIMÉTRIQUE DE PROSPECTION DU SOUS-SOL

(SEISMIC AND GRAVIMETRICAL METHODS OF SUBSOIL PROSPECTING)

Editorial note

Le Génie Civil, Paris, vol. 100, No. 16, 1932, p. 405.

Brief summaries are given of articles published in the Annales de Mines, vol. 20, No. 10, 1931, by A. Maillet and J. Bazerque, and in vol. 20, No. 11, 1931, by M. H. Galbrun. Abstracts of these articles were published in Geophysical Abstracts No. 35, p. 387, and No. 37, p. 441, respectively.--W. Ayvazoglou.

(1015) USE OF GEOPHYSICS IN PROSPECTING FOR OIL AND GAS POSSIBILITIES NOT MYSTERIOUS

By K. C. Heald

The Oil and Gas Journal, Tulsa, vol. 31, No. 4, 1932, pp. 41-43.

The author says that although there is much that is difficult to learn, and a great deal that remains to be learned about geophysical methods, there is nothing mysterious. Of course, a clear understanding of the fundamental rules is necessary for the application of geophysics.

Explanations of some principles of geophysics, especially concerning oil prospecting, are given under the following headings:

Anticlinal theory. The theory developed now is that oil and gas tend to move through porous formations from regions of higher toward regions of lower pressure, and where this movement is arrested oil and gas pools form.

Search for structure. There are three primary requisites for an oil pool: (1) Favorable structure, including lenticular sand and fissured limestone conditions that lead to oil accumulation, (2) a suitable reservoir rock of "pay," and (3) an adequate source for the oil. It is to this search for structure that geophysical methods of prospecting are applied. The method most widely used is the gravimetric and the instrument is the torsion balance.

Pull of gravity. The torsion balance will reflect changes in structure of the rocks, and will accurately reflect such phenomena as anticlines, synclines, and large faults. However, many factors render the interpretation of torsion-balance data into terms of oil-field structure difficult and, at times, impossible. Every hill, every heavy bowlder close beneath the surface, will interfere with the recognition of the effects due to structure.

Different pulls. There are areas where the geologic structure is so complex that in spite of the existence of beds strongly contrasting in mass, the instrument is affected by so many pulls from different directions that it has proved impossible to convert the instrumental records into a reasonable

ological picture. Thus the conclusion is drawn that the torsion balance
ll work most effectively in areas where the surface is flat, where there
e no hidden "pockets" of either light or heavy material hidden close below
e surface, where there are certain units among the formations within drill-
g depth that are appreciably heavier than those overlying them, and where
ructural conditions are comparatively simple. The torsion balance is
tally unsuitable for work in areas where the surface is cut into high
dges and deep valleys, where the rocks at a depth of 1,000 feet or more are
sely folded or complexly broken by faults, or where the rocks down to the
mits of drilling depth furnish no appreciable contrast in the mass of indi-
dual units of formations.

Cost considered. Exclusive of the original cost of the equipment a
rsion-balance party with two balances should be operated for approximately
,000 a month. During that time they should make approximately 120 determin-
ions of gravity. The territory they will cover, and therefore the cost per
re, will depend upon the detail which is essential in view of the expected
ological conditions. According to data obtained from the Mid-Continent
ea a party can cover about 60 square miles at a cost of between 8 and 9
nts per acre. Very detailed examination may increase the cost to about 30
nts per acre.

Seismic methods. Physical principles of seismic methods are given brief-
and their subdivision into "refraction" and "reflection" methods is ex-
ined.

Search for salt domes. The refraction method has been particularly
fective in discovering salt domes which lie less than 5,000 feet below the
rface. The refraction seismograph is particularly suitable to explore
rritory where there are neither very elastic beds, such as heavy limestone,
incoherent beds; where the formations down to a depth of at least several
dred feet are soft shales and sandstones with a highly elastic bed, and
ere the geologic structure is relatively simple. It is not recommended for
k in areas where rocks are sharply folded, with individual beds inclining
e than 30° from the horizontal, or where there are closely spaced faults.

Refraction seismograph cost. Exclusive of the original cost of the equip-
t an effective refraction seismograph party will call for an expenditure
from $16,000 to $22,000 per month. In that time they should explode about
charges of dynamite for depth determinations. The cost per acre varies
atly. Reconnaissance surveys for the discovery of salt domes have been
e for as little as 4 cents an acre, while detailed surveys under difficult
ditions may cost more than $5 an acre.

Reflection method. This method has been proved effective in some areas
re refraction work is unsatisfactory, either because of excessive cost or
ause of geological conditions.

Computing vibration speed. If the seismograph operator knows that a
tain per cent of the rocks down to a depth of, say, 6,000 feet is shale,

another per cent is heavy beds of limestone, and the remainder are sandstones, the geophysicist will compute a reasonable speed, based upon experience in other areas and upon the known average velocities of seismic waves in shales, limestones, and sandstones.

Most favorable conditions. Favorable conditions, as well as those which are unfavorable for application of geophysical methods, are discussed.

Reflection seismograph cost. The over-all cost per troop ranges from $8,000 to $12,000 per month. An average of 4 to 8 depth determinations can be made per day, depending upon the conditions under which the work is done and the precision attempted. Under conditions such as exist in the Mid-Continent region, the cost per acre will range from as much as 90 cents to as little as 5 cents.

Magnetic method of geophysical prospecting is mentioned, but although unquestionably more territory in the United States has been covered by the magnetic than by any other geophysical method, it has fewer oil-field discoveries to its credit than has either the gravimetric or the seismic work. Besides, the difficulty of interpretation makes this method less applicable than the two other methods.

Cost considered. For a cost of not more than $400 it should be possible to cover approximately 200,000 acres a month by magnetic methods commonly used, making the cost of this examination approximately $0.002 per acre.

In conclusion, the author notes that none of the methods mentioned attempt to discover oil or gas directly. Their entire purpose is to secure geological information.--W. Ayvazoglou.

(1016) GEOPHYSICAL METHODS LOCATE METEORITE

By J. J. Jakosky

Engineering and Mining Journal, New York, vol. 133, No. 7, 1932, pp. 392-393.

Results of geophysical investigations of the Meteor Crater were given in a previous article, Geophysical Examination of Meteor Crater (see Geophys. Abs. 25, p. 127).

From these results exploration was recommended in five locations. According to the present article two of these holes have been completed, both of them definitely checking the indications of the geophysical survey as regards the occurrence, location, and depth of the meteoric material, as well as the depth to water and other structural effects.--W. Ayvazoglou.

8. GEOLOGY

(1017) GEOLOGIC INTERPRETATIONS FROM ROTARY WELL CUTTINGS

By Robert M. Whiteside

Bulletin of the American Association of Petroleum Geologists,
vol. 16, No. 7, 1932, pp. 653-674.

The paper includes the history, improvement, and possibilities of geo-
gic interpretation of strata in the Mid-Continent area from rotary-drill
ttings by the use of microscopy. The field technique with its certain ad-
nces in obtaining drill cuttings forms Part I. The laboratory technique
preparation, examination, and correlation of rotary-drill cuttings forms
rt II.--Author's abstract.

(1018) BOGGY CREEK SALT DOME, ANDERSON AND CHEROKEE COUNTIES, TEXAS

By H. J. McLellan, E. A. Wendlandt, and E. A. Murchison

Bulletin of the American Association of Petroleum Geologists, Tulsa,
vol. 16, No. 6, 1932, pp. 584-600.

Boggy Creek salt dome is located near the axis of the east Texas geo-
ncline in Anderson and Cherokee Counties. It is of interest principally
cause it is the only interior salt dome in east Texas or Louisiana on
ich an oil field has been developed. Surface geology first attracted
tention to this area, and exploration was carried on later by core tests
l geophysical work.

This dome has many of the physiographic and structural features char-
teristic of other interior domes, but is unusual in shape, size, and other
spects. A structurally low central area is found on top of the dome.
ulting is present near the south end of the uplift.

The salt movement probably occurred contemporaneously with that of other
st Texas domes, being most pronounced between middle Wilcox and Carrizo
ncs. In the central and northern portions of the dome, salt movement also
curred after the deposition of the Lower Claiborne beds.

Oil and gas is produced from the Woodbine formation in a long, narrow
ea on the southeast flank of the dome. The oil-producing area contains
out 200 acres and the gas area about 50 acres. Present average daily pro-
ction is about 1,000 barrels. Ultimate recovery from this field is not
pected to exceed 4,000,000 barrels.--Authors' abstract.

(1019) FAULTS IN COMODORO RIVADAVIA OIL FIELD, ARGENTINA

By Enrico Fossa-Mancini

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 6, 1932, pp. 556-577.

This article is a summary of the material published on the structural conditions of the Comodoro Rivadavia oil field by the Bureau of Mines and the oil administration of the Department of Agriculture of the Argentine Republic. The formations are much faulted, with resulting complications in structure. Other difficulties are irregular bedding, pinching sand bodies, and variable cementation. It is difficult in this area to map underground structure from surface indications.--Author's abstract.

(1020) ON THE MECHANICS OF MOUNTAINS

By Harold Jeffreys

Geological Magazine, London, vol. 68, No. 808, 1931, pp. 435-442.

It appears that the geophysical approach to the problems of crustal dynamics leads to a theory of mountain formation that covers the main features of the formation of nappes and is in general agreement with other geological evidence. The chief novelty is in the recognition of the importance of the spreading under their own weight of the rocks uplifted as a result of crustal shortening.--Author's abstract.

9. NEW BOOKS

021) Johannsen, Albert. A descriptive petrography of the igneous rocks. Vol. 1, University of Chicago Press, 1931, 267 pp., 145 figs. Price $4.50. Introduction, textures, classification, glossary.

022) National Oil Scouts Association of America (Inc.). Year Book, 1932. May, 1932, 275 pp., 12 maps, statistical tables. Price $5.00. Obtainable through J. W. Selby, Shell Petroleum Corporation, Dallas, Texas. This yearbook is a compendium of the oil, gas, sulphur, and potash operations and the development of the south and southwest.

023) National Research Council. Transactions of the American Geophysical Union, Thirteenth annual meeting, April 28 and 29, 1932, Washington, D. C. National Academy of Sciences, Washington, D. C., June, 1932, 401 pp. The reports and papers presented at this meeting are given according to the sections into which the Union is divided. The contents of the book are as follows:

General assembly (pp. 5-49). - (1) Resolutions adopted: On the urgent need of continuing oceanographic work without material curtailment; on gravity work at sea by the United States Navy; regarding the purchase of apparatus for determining gravity at sea; on Naval Observatory time-signals; on the need of nongovernmental research institutions in meteorology; in commendation of Geophysical Abstracts, published as an information circular of the U. S. Bureau of Mines; on the Second International Polar Year, 1932-33; on the death of Alfred Judson Henry; on the depth of Robert DeCourcy Ward; on the death of Louis Bauer. (2) symposium on the application of geophysics to ocean basins and margins: Introduction, by Richard M. Field; Problems of island-arcs and ocean deeps, by Walter H. Bucher; The structure of the Bartlett Trough, by Stephan Taber; Seismic zones as related to relif of ocean-bottom, by N. H. Heck; Interpretation of gravity-anomalies and sounding-profiles obtained in the West Indies by the international expedition to the West Indies in 1932, by Harry Hammond Hess; Sounding the depths of the ocean for mapping the conformation and topography of the bottom, by G. W. Littlehales; The applications of seismic methods to submarine geology, by E. DeGolyer; Torsion-balance surveys in southwest Louisiana and southeast Texas, by D. C. Barton; Experiences of a soismologist with "seismic methods," by A. L. Day; Discussion following symposium.

Section of Geodesy (pp. 51-88). - (1) Progress report on the absolute determination of gravity at Washington, by Paul R. Heyl; (2) Improvements in the gravity apparatus of the United States Coast and Geodetic Survey, by E. J. Brown; (3) Gravity observations in the Bahamas, by J. P. Lustene; (4) Isostasy and related subjects, by F. A. Vening Meinesz; (5) Progress-report on radio dissemination of the national primary standard of frequency, by J. H. Dellinger; (6) Geodetic control for the plotting of the aerial photographs of the Belcher Islands, by Noel J. Ogilvie; (7) Analytical methods in aerial photogrammetry, by Earl Church; (8) New comparisons of the invar wires of Mexico, by Manuel Medina; (9) Progress report on investigation of invar tapes and precision circles, by L. V. Judson; (10) Geodetic work accomplished from May 1, 1931, to April 30, 1932, by William Bowie; (11) Further studies on the lunar correlations with small changes in the variation of latitude, by Harlan T. Stetson.

Section of seismology (pp. 89-110). - Symposium on the application of seismology to the study of ocean-basins: (1) Seismology and the ocean-basins, by N. H. Heck; (2) Accuracy of epicenter determinations, by Frank Neumann; (3) Applications of interferometric tiltmeters in the problems of geophysics, by George E. Merritt; (4) Seismology and structural geology, by W. T. Thom, jr.; (5) Earthquakes in the north Atlantic as related to submarine cables, by V. P. dc Smitt.

Section of Meteorology (pp. 111-142). - (1) Weather Bureau program for the Second International Polar Year, by W. R. Gregg; (2) The use of polar year data in the study of atmospheric interchange, by W. J. Humphreys; (3) A program for the observation of weather changes during the total solar eclipse of August 31, 1932, by S. P. Fergusson and Charles F. Brooks; (4) Determination of atmospheric turbidity, by Herbert H. Kimball; (5) On winds in the upper atmosphere, by E. O. Hulburt; (6) Winds of the Antarctic, by W. C. Haines; (7) a study of the interrelation between air-temperatures in California and ocean temperatures in the northeast Pacific and its influence on long-range forecasting, by A. F. Gorton; (8) Notes on the exchange of energy between ocean and atmosphere, by W. F. McDonald; (9) Weather-charts for the northern hemisphere, by E. B. Calvert; (10) Fifty years of North American rainfall, by Oliver F. Fassig; (11) Atmospheric water-vapor, by Frederick E. Fowle.

Section of Terrestrial magnetism and electricity (pp. 143-191). - (A) Reports on magnetic and electric work of organizations in the United States during 1931-32: (1) Summary of reports received, by Harlan W. Fisk; (2) Auroral station at the Alaska Agricultural College and School of Mines, by Veryl R. Fuller; (3) Work of the Bell System relating to terrestrial magnetism and electricity during 1931, by Otto B. Blackwell; (4) Magnetic investigations of the Carnegie Institution of Washington, May 1931 to April 1932, by J. A. Fleming; (5) Researches at Mount Wilson Observatory of the Carnegie Institution of Washington relating to terrestrial magnetism, by Seth B. Nicholson; (6) Colorado School of Mines, by C. A. Heiland; (7) Massachusetts Institute of Technology: (a) Cooperation in the cosmic-ray survey, by Ralph D. Bennett; (b) The elimination of night-course variations in radio range-beacons, by N. G. Kear; (c) Developments in geophysical prospecting by electrical-potential methods, by W. Spencer Hutchinson. (8) Solar-constant work by the Smithsonian Institution, by C. G. Abbot; (9) Research in atmospheric electricity at the Stanford University, by Joseph G. Brown; (10) Geophysical work at the United States Bureau of Mines, by Scott Turner; (11) Magnetic work of the U. S. Coast and Geodetic Survey, by R. S.

Patton; (12) Work of the U. S. Hydrographic Office in terrestrial magnetism and electricity, by W. R. Gherardi; (13) Work related to terrestrial magnetism and electricity of the Naval Research Laboratory, by E. D. Almy; (14) United States Signal Corps, by G. E. Kumpe. (B) Papers: (1) On calculations of the ionization in the upper atmosphere, by E. O. Hulburt; (2) The geophysical significance of radio measurements of the ionized layer, by M. A. Tuve; (3) radio exploration of ionization of the upper atmosphere, by J. H. Dellinger; (4) Kennelly-Heaviside-layer measurements on the Byrd Antarctic Expedition, 1929-30, by Malcolm P. Hanson; (5) Some common periodicities in radio transmission-phenomena, by G. W. Kenrick and G. W. Pickard; (6) Progress in the studies of cosmic correlations with radio reception at the Perkins Observatory, by Harlan T. Stetson; (7) Slow-moving ions in the atmosphere, by G. R. Wait and O. W. Torreson; (8) Principles of a new portable electrometer, by Ross Gun; (9) Optically compensated variometers and wide-range recorders to be used during the Jubilee Polar Year, by H. F. Johnston; (10) The relation of lightning discharges to changes in the electrical field of thunder storms, by J. C. Jensen.

Section of oceanography (pp. 193-263). - (1) Progress in the Woods Hole Oceanographic Institution and cruises of the Atlantic, by H. B. Bigelow and C. Iselin; (2) Oceanographic work at the Scripps Institution of Oceanography, University of California, La Jolla, California, July 1, 1932, to April 18, 1931, by T. Wayland Vaughan; (3) Contributions of the United States Hydrographic Office to oceanography, by A. B. McManus; (4) Oceanographic work of the Coast and Geodetic Survey during the past year, by Frank S. Borden; (5) On the penetration of daylight into the sea, by E. A. Hulburt; (6) Photo-electric measurements of the penetration of light in sea water, and the results of laboratory photo-electric measurements of the absorption-coefficient of sea water, by Burt Richardson; (7) Landslide modification of submarine valleys, by Francis P. Shepard; (8) Microbiology of the marine limestones, by Richard M. Field; (9) Radium content of ocean-bottom sediments, by C. S. Piggot; (10) Temperature gradients in ocean waters, by E. B. Stephenson; (11) Progress in the investigation of surface temperatures of the western north Atlantic, by Phil E. Church; (12) The recommendation of a program of hydrographical observations leading to the quantitative determination of Arctic and Atlantic interchanges, by E. H. Smith; (13) Oceanographic work of the United States Coast Guard during 1931 and plans for 1932, by N. G. Ricketts; (14) A recent tour of some oceanographic centers of northwest Europe, by Charles F. Brooks; (15) Sea temperatures by bucket on express liners, by Charles F. Brooks.

Section of volcanology (pp. 265-273). - (1) Central American volcanoes in 1932, by E. G. Zies; (2) The volatility of silica with steam, by George W. Morey; (3) Volcanologic developments in 1931-32, by T. A. Jaggar.

Section of hydrology (pp. 275-401). - (A) Annual reports of permanent committees for 1931-32. (B) Papers: (1) Recent investigations of Thiem's method for determining permeability of water-bearing materials, by L. K. Wenzel; (2) Equation for lines of flow in vicinity of discharging artesian well, by Charles V. Theis; (3) Characteristics of run-off of southeastern Alaska, by Fred F. Henshaw; (4) Certain flood-flow phenomena of Iowa rivers, by Floyd A. Nagler; (5) Forces acting on soil moisture in relation to other fundamental functions, by N. E. Edlefsen; (6) The disposal of moisture from the aerated portion of soils, by F. J. Veihmeyer; (7) The relation of hydrographs of run-off to size and character of drainage-basins, by LeRoy K. Sherman; (8) Velocity of flow in natural streams, by H. K. Barrows; (9) Drainage-basin characteristics, by Robert E. Horton; (10) The 1929 floods on eastern North Carolina streams, by Thorndike Saville; (11) Investigations of the fluctuations of water levels in observation wells in Virginia, by R. C. Cady; (12) Investigations of the fluctuations of the ground-water table in Pennsylvania, by S. W. Lohman; (13) Hydraulic and sedimentary characteristics of rivers, by L. G. Straub; (14) New thoughts on river regulation, by Gerard H. Matthes; (15) Model research in the river hydraulic laboratory of the Massachusetts Institute of Technology, by J. B. Drisko; (16) Present status of the National Hydraulic Laboratory, by K. Hilding Berg; (17) New formulae for predicting annual runoff of some California watersheds, by A. F. Gorton; (18) Rainfall and run-off characteristics of the Delaware River Basin, by Clarence S. Jarvis; (19) Checks on the model law for hydraulic structures, by Morrough P. O'Brien; (20) A method for computing the amount of evaporation of sea water from a tank by changes in salinity, with experimental results obtained on board the SCRIPPS, August 13-24, 1928, by Burt Richardson; (21) Problems of underground water flow in the oil industry, by Morris Muskat.

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UNITED STATES BUREAU OF MINES
Scott Turner, Director

GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1024) EIN STATISCHER SCHWEREMESSER

(A STATICAL APPARATUS FOR GRAVITY MEASUREMENTS)

By H. Haalck

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 5, 1932, pp. 197-204.

This paper continues the article published by Haalck under the same title in Zeitschrift für Geophysik, vol. 8, No. 1/2, 1932, pp. 17-30 (see Geophys. Abs. 38, p. 466).

Haalck's article deals with:

8. The dimensions of the apparatus.
9. The experimental determination of the scale value.
10. The locking device and the adjusting device.
11. Practical carrying out of gravity measurements on the terrain.
12. Results of measurements.

According to the author, the accuracy of measurements carried out by the apparatus on the terrain is about equal to ± 10 milligal.--W. Ayvazoglou.

(1025) DIE ALLGEMEINE KOINZIDENZKURVE

(THE GENERAL COINCIDENCE CURVE)

By H. Martin

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 5, 1932, pp. 205-215.

The author makes general investigations on the relationship between the ratio of frequency of two oscillation processes and the corresponding coincidence curves. Experimental examples are given for explanation.

The arrangement of the experiments is shown schematically in a figure.--W. Ayvazoglou.

2. MAGNETIC METHODS

(1026) CONTRIBUTION TO THE THEORY OF MAGNETIC METHODS OF PROSPECTING (IN RUSSIAN)

By D. V. Frost

Izvestia Russkago Nauchnago Instituta (Bulletin of the Russian Scientific Institute), Belgrade, No. 6, 1932, pp. 87-134.

The purpose of this paper is to show that in case of weakly magnetized deposits - that is, when the inductive influence of the terrestrial magnetism must be taken into consideration and therefore the theoretical investigation and the formulas obtained become more complicated - it is possible to obtain results similar to those derived by Frost in his previous work by which places having strongly magnetized ore deposits were determined.

In this paper Frost derives formulas for the effect of a homogeneous magnetic ellipsoid of rotation. The author tries to abbreviate and simplify the conclusions and to apply them to all the possible forms and positions of the ellipsoid.

Mathematical discussion is given under the following headings: Effect produced by an ellipsoid magnetized equally:

1. Effect produced by a magnetic molecule upon an external point.
2. Effect produced by finite magnetic body upon any point.
3. Effect produced by an equally magnetized ellipsoid upon a point situated on its surface.
4. Ellipsoid of rotation:
    - (a) Poisson's theorem.
    - (b) Determination of magnetic moments α, β, γ, in case of the effect produced by constant magnetic forces.
    - (c) Magnetic conditions of the ellipsoid magnetized by constant forces.
    - (d) Effect produced by the ellipsoid upon an external point (Ivory's theorem).
    - (e) Direction of magnetization.
    - (f) Effect produced by the magnetic ellipsoid of rotation.
    - (g) Magnetization along the vertical axis.
    - (h) Investigation of the horizontal and vertical components.
    - (i) Vertical tension.
    - (k) Zero value of the vertical component.--W. Ayvazoglou.

(1027) A MAGNETIC STUDY OF SOME IRON DEPOSITS

By E. F. Stratton and J. Wallace Joyce

U. S. Department of Commerce, Bureau of Mines, Washington, D. C., Technical Paper 528, 1932, 32 pp.

According to the authors the purpose of this investigation is to describe the operation of the magnetometer, to give possible interpretations of anomalie determined by its use which would have practical value to the geologist and mining engineer, and to present as examples the results of magnetic studies made in certain important iron districts east of the Mississippi River.

Contents:

Description of the Askania magnetometer.
Operation of the instrument.
Theoretical anomalies and interpretation of results.
Field work: Location of areas; choice of traverses; preparation of results; Mineville area (geology, location of test areas, results); southern area; northern area; second magnetite district; sedimentary iron ores - Menominee range; eastern district (geology, results); western district (geology, results); general conclusions; bibliography.
Twenty illustrations.

From the material presented in this paper the authors conclude that: (1) the conditions under which the magnetometer may be used to advantage must be considered in its application to the science of geophysical prospecting, and (2) a reasonable interpretation of the measured magnetic anomalies presents a problem.

The authors have endeavored to illustrate the absurdity of attempting to present any dogmatic criteria for the interpretation of particular types of singularities in the magnetic curves. Examples of the confusion that may arise from such a course are exceptionally well illustrated in the results of the Mineville work. Thus faults, ore boundaries, and contacts between rocks of varying magnetic content all produce similarly shaped singularities. Likewise, changes in depth, thickness, and amount of mineralization produce similar results. Only by taking full advantage of all known geological facts and by carefully studying the shapes and magnitudes of the magnetic curves can there be any hope of successfully differentiating between these various features.

Certain general rules may be laid down, but these have value only insofar as they are used with discretion and are supplemented by due recognition of the significance of all available geological data.

Where applicable the magnetometer is a relatively fast, easily operated, eliable instrument. When properly used it can be a great aid to the geologist nd mining engineer.

The examples given in the paper illustrate some of the conditions pre-ented in conducting a magnetic survey of this type and the reasoning employed n the solution of these conditions.--W. Ayvazoglou.

(1028) DIE MAGNETISCHE STÖRUNG VON NIEDER-KALIFORNIEN UND IHRE GEOLOGISCHE BEDEUTUNG

(MAGNETIC DISTURBANCE IN LOWER CALIFORNIA AND ITS GEOLOGICAL IMPORTANCE)

By Robert Schwinner

Centralblatt für Mineralogie, Geologie und Paläontologie, Stuttgart,
Abt. B., No. 6, 1932, pp. 307-310.

According to the author the magnetic disturbance in Lower California must e considered among the most remarkable phenomena of this kind. A description f this phenomenon has been given by T. Gallo in an article entitled "Report of he Magnetic Station of the Astronomic Observatory of Tacubaya (Mexico)," pre-ented during the proceedings of the meeting of the International Geodetic and eophysical Union in Stockholm in August, 1930.

A map showing the isogans in the region of Mexico and Lower California as iven by T. Gallo, is reproduced in this article. A possible geological ex-lanation of the cause of the disturbance is discussed.--W. Ayvazoglou.

(1029) ESPLORAZIONE GEOFISICA REGIONALE DELLA SICILIA

(GEOPHYSICAL EXPLORATION IN SICILY)

By R. Fabiani and G. Petrucci

La Miniera Italiana, Rome, vol. 15, No. 7, 1931, pp. 225-228.

A brief description of a geomagnetic anomaly in the region of Pachino Sicily) is given.

Two maps showing the vertical isodynamics, and the horizontal isodynamics round Pachino are added.--W. Ayvazoglou.

(1030) L'ODIERNA INDAGINE MAGNETICA DEL SOTTOSUOLO

(PRESENT TIME MAGNETIC INVESTIGATION OF THE SUBSOIL)

By A. Belluigi

La Miniera Italiana, Rome, vol. 15, No. 7, 1931, pp. 37-41.

Some problems and achievements of magnetic exploration of the subsoil are briefly described.--W. Ayvazoglou.

3. SEISMIC METHODS

(1031) GEOPHYSICAL RESEARCH AT HARVARD UNIVERSITY

Editorial note

Science, New York, vol. 75, No. 1944, 1932, p. 353.

The project for geophysical research undertaken by the Harvard University will concentrate at the start on data of basic values in seismology, in particular on the study of the properties of certain rocks and rock minerals under very high pressures and at high temperatures. The investigation will continue for five years.

To accomplish the task of combining high pressures with high temperatures, apparatus is now being designed by Professor Bridgman, under whose direction the research on the elastic properties of rocks and the effects of high temperature and pressure will be carried out. Field measurements of the velocity of seismic waves in rocks of different types are already under way by means of artificially produced earthquakes of small scale, in carefully selected localities where geologic details are accurately known.--W.Ayvazoglou.

(1032) THE APPLICATION OF THE REFLECTION SEISMOGRAPH

By Eugene McDermott

Physics, Menasha, vol. 3, No. 1, 1932, pp. 39-52.

Two general divisions of seismic methods of exploration, the refraction and the reflection methods, are briefly explained.

The four general types of geologic structure (salt dome structure, anticlinal structure, faulted structure, and shore line structures) are described.

After a brief examination of structure determination by the refraction method, McDermott makes a more detailed investigation on reflections (velocity and angle of reflection), supplementing this part of the article by a series of reflection records and seismograms.

Records and cross section of the north extension of the Mexia-Powell ult zone are given to show how a faulted area may be delineated by means the seismograph.

The author expresses the opinion that owing to the great improvement of e instruments and the technique of the reflection method there are few prosctive oil-bearing areas where it is not now possible to use the method to vantage.--W. Ayvazoglou.

(1033) PROSPECTING FOR NATURAL GAS IN NEW YORK STATE

By Frank Brewster, Paul D. Torrey, and John A. Thompson

Mining and Metallurgy, New York, vol. 13, No. 307, 1932, pp. 316-318.

Geophysical exploration for natural gas in New York State by seismic reection method was started in December, 1931. Several hundred thousand acres ve been surveyed by seismograph at an average cost of 5 cents an acre. In rtain localities it has been possible to map subsurface conditions on as ny as four reflecting horizons - namely, the Onondaga limestone, of lower vonian age; the Niagara and Clinton limestones of the Silurian; the Trenton mestone of middle Ordovician, and lastly the basal granite of Cambrian age.

The authors conclude that so far New York State in general has proved eal for seismic exploration by the reflection method. The fairly uniform gional dip to the southwest along with the known rate of divergence makes readily possible to correlate the reflecting data.--W. Ayvazoglou.

(1034) ESTUDIO DE PROSPECCION GEOFISICA EN ALCALA DE HENARES (SPAIN) POR EL METODO SISMICO

(DISCUSSION ON SEISMIC METHOD OF GEOPHYSICAL PROSPECTING IN ALCALA DE HENARES, SPAIN)

By Jose G. Sineriz

International Geological Congress, Compte Rendu of the XV Session,
South Africa, 1929, Pretoria, vol. 2, 1930, p. 606.

The seismic method of investigating the valley in which the city of Alcala Henares is situated was used by the author to locate places suitable for illing artesian wells to provide the city with water. Seismic profiles exnding over about 50 miles were furnished.

Details of the investigations are given in Chapter XVIII, pp. 305-314 of neriz's work "Los Metodos Geofisico de Prospeccion" (see Geophys. Abs. 15). W. Ayvazoglou.

(1035) DIE SEISMISCHE BODENUNRUHE ZWEITER ART IN HAMBURG UND IHRE URSACHE

(SEISMIC EARTH DISTURBANCE OF THE SECOND ORDER IN HAMBURG AND ITS CAUSE)

By E. Töpfer, according to H. Schünemann

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 5, 1932, pp. 216-226.

An earth disturbance in Hamburg of the first order (period of waves not over 7 seconds) has been investigated in detail by Mendel (see Geophys. Abs. 13, p. 8). This article deals with seven microseismic disturbances of the second order (period of waves from 10 to 40 seconds) which occurred in Hamburg during the years 1909 to 1914. These disturbances lasted in total over 122 hours and allowed measurements to be made of the amplitudes and periods of abo 4,800 waves. Registrations of the N-S components and E-W components were made by means of two Hecker's horizontal pendulums; the mean values of the constant for both the components were as follows: Proper period, by eliminating the damping, $T_0 = 18$ seconds, indicator increase $V = 32$, damping ratio $\mathcal{E} = 5$. The frequency of the single amplitude values and period values, and the correl tion between these two values were investigated, as well as the relation of the earth disturbance with regard to the strength of the wind and to the wind pressure.

The question of the reality of this earth disturbance led finally to a thorough investigation of the particular local conditions.--Author's abstract translated by W. Ayvazoglou.

4. ELECTRICAL METHODS

(1036) ORE PROSPECTING BY SWEDISH GEOELECTRICAL METHODS

By Hans Lundberg and Karl Sundberg

Proceeding of the World Engineering Congress, Tokyo, 1929, vol. 37, part 5, 1931, pp. 167-177.

The authors discuss the theoretical principles upon which the Swedish geoelectrical methods of prospecting are based. Potential methods, electromagnetic methods, and inductive methods are briefly described. Practical results referring to the discovery of deposits of great commercial importance, such as the Boliden ore and other deposits in northern Sweden, as well as deposits at Buchans, Newfoundland, in Canada, and at Questa in the United States, are mentioned.--W. Ayvazoglou.

(1037) PROVE EXTENSION PORCUPINE ROCKS

Editorial note

The Northern Miner, Toronto, Canada, vol. 18, No. 24, 1932, p. 16.

Geophysical survey by electrical method of a 12,000-acre block of ground st of Porcupine camp has been carried out since March by the Swedish American ospecting Co.

Indications are reported to be of an encouraging nature, and diamond illing is being commenced for further geological information. It is believed at the geophysical work has located the extension of the belt of Temiskaming diments that show as one of the prominent features of Dome Mines. This belt s previously proved by surface geological investigation to extend some dis- nce east.--W. Ayvazoglou.

(1038) AN ELECTROCHEMICAL METHOD OF ORE EXPLORATION

By Atsushi Matsubara

Proceedings of the World Engineering Congress, Tokyo, 1929, vol. 37,
part 5, 1931, pp. 229-242.

In the surface-potential method of electric ore exploration it was found at the enormous resistance of the earth sometimes hindered the accurate asurement of the potential.

In this article the author discusses a method by which the measurement can accomplished in circuits of less resistance. The method consists in measur- g the potential of various portions of the surface of the ore against the rrounding ground water by employing the orebody itself as an electrode and plotting the result into a potential map. This method, according to the thor, makes it possible not only to work in circuits of less resistance, but so reveals the position and shape of the orebody more sharply than does the dinary surface potential method. Further, the method can be applied in the ploration of any concealed orebody which lies in the vicinity of the known e.

Some details of this method are described and its relation to the ordinary rface-potential method is discussed under the following headings:

1. Principle of the method:
    (a) Exploration of a partly known orebody;
    (b) Exploration of unknown ore masses.
2. Example of result of exploration.
3. Comparison of this method with the ordinary surface potential method:
    (a) Comparison of the potential maps;
    (b) Comparison of the resistance of the circuit.

Matsubara's summary reads as follows:

1. If we measure the surface potential of various points of a sulphi orebody by grounding a half-cell at various points on the ground surface, and plot a potential map from the result, the latter shows the position and the approximate shape of the orebody.

2. An unknown orebody or bodies may be explored by the same operation. In this case the measured potential of the counter electrode may not be that of the electrode orebody but, by the relative upheaval of potential, the map enables us to detect the hidden orebodies.

3. The difference in the result of this method from that of the ordinary surface potential method is sometimes conspicuous, but sometimes is almost nil.

4. The resistance of the circuit is always smaller in the present method, and the measurement can be accomplished more easily, but the necessity of long wiring sometimes renders this method very tedious or even impracticable. In a region where a sulphide orebody is known to be accessible even at its outcrop, this method may be conveniently applied in further exploration.--W. Ayvazoglou.

(1039) EXPERIMENTAL STUDIES ON THE POTENTIAL METHOD OF ELECTRICAL PROSPECTING

By Yoshizo Fujita

Proceedings of the World Engineering Congress, Tokyo, 1929, vol. 37, part 5, 1931, pp. 229-242.

In this paper the author gives part of the results of laboratory experiments on conducting deposits; the experiments have been based mainly on fundamental studies made with the current-supplied potential method, using line electrodes.

The apparatus used for the laboratory experiments and a diagram showing the arrangement of the experiment are shown in figures.

Contents of the article:

Chapter 1. Experimental studies on the electrode setting: (a) Potentia distribution in the artificial electrical field; (b) perturbation due to the good or bad conducting orebody; (c) investigation of the most favorable position of orebody in the explored area; (d) relations among the orebody, the length of electrodes, and the electrode spacing.

Chapter 2. Detectable depth of the submerged orebody: (a) Effect of the riation of the electrode spacing on the detectable depth; (b) influences of e variable length of the electrodes upon the detectable depth; (c) influences the various lengths of the strike upon the detectable depth; (d) effects of e various thickness of the orebody upon the detectable depth; (e) influences the various extensions along the dip upon the detectable depth; (f) influ- ces of the dip of the orebody on the detectable depth.

Chapter 3. Factors causing disturbances: (a) The shape and volume of e orebody as factors; (b) the thickness and shape of the orebody as factors;) the length of the strike and the volume as factors; (d) the dip side ex- nsion and the shape as factors; (e) the dip side extension and the volume as ctors; (f) the thickness and the dip side extension as factors; (g) the thick- ss and length of the strike as factors; (h) the length of the strike and the p side extension as factors.

In conclusion the author says that the importance of some of the problems y be emphasized to advantage, as follows:

1. In the field where there are no indications of an orebody, a connaissance may be carried out with electrodes placed in a suitable manner. om the interpretation of the results of the preliminary test, mainly the in- stigation of the characteristic features of equipotential curves, a general ea of the strike, dip, and extension of an otherwise unknown orebody can sily be obtained.

2. As a general rule the larger electrodes and the shorter electrode acing are to be preferred.

3. Although the setting of the longer electrodes is tedious work and im- ssible in some fields, electrodes as long as possible should be used where nditions permit.

4. The orebody may be situated in the central part of the explored area i its strike may be considered to be perpendicular to the electrodes.

5. In order to obtain a clear definition of the strike, the space between ectrodes may be made greater than twice the length of the strike.

6. There is no need to place the line electrodes deep in the ground, but ey must be laid down upon the ground and brought into close contact with it.

7. From results obtained by electrical prospecting carried out in a itable manner, one can easily determine the thickness, the length of strike, e dip side extension, and the dip angle of a tabular conducting orebody.

8. The detectable depth generally varies from 33 to 88 per cent of the ngth of the strike and has never exceeded 90 per cent.

9. A horizontally extended orebody influences the disturbance of potential distribution on the explored area more greatly than a vertically extended ore.--W. Ayvazoglou.

(1040) LA PROSPECTION ÉLECTRO-MAGNÉTIQUE ET LES MINES D'OR SUEDOISES DE BOLIDEN

(ELECTROMAGNETIC METHOD OF PROSPECTING AND THE SWEDISH GOLD MINES OF BOLIDEN)

By Christian de Caters

La Nature, Paris, No. 2884, July 1, 1932, pp. 27-30.

A description of the discovery of auriferous deposits at Boliden, Sweden, by the electromagnetic method is given briefly.

In the second half of the article the author mentions the results attaine by electromagnetic prospecting in some other parts of the globe (Newfoundland, Canada, New Mexico, Cyprus, etc.).--W. Ayvazoglou.

(1041) METHODS USED IN ELECTRICAL PROSPECTING

By Joseph I. Heller

Electronics, New York, vol. 3, No. 5, 1931, pp. 184-185 and 214.

The purpose of this article is to present some accomplishments in the field of geophysics through the applications of electrical, and often electron principles and apparatus.

An outline of the following methods used in electrical prospecting is given: (1) The equipotential method. (2) The potential ratio method. (3) The electromagnetic ratio method. (4) The electromagnetic compensation method.

Diagrams are added.--W. Wyvazoglou.

(1042) BERICHTIGUNG ZU DER ARBEIT "DER SCHEINBARE SPEZIFISCHE WIDERSTAND"

(CORRECTION TO THE WORK "THE APPARENT SPECIFIC RESISTANCE")

By J. N. Hummel

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 5, 1932, pp. 249-250.

Hummel here gives a correction of the equation derived by him for the apparent specific resistance and published in his article in Zeitschrift für Geophysik, vol. 5, No. 3/4, 1929, pp. 89-104 (see Geophys. Abs. 9, p. 21). --W. Ayvazoglou.

5. RADIOACTIVE METHODS

(1043) UNTERSUCHUNGEN AM ELEKTRONENZÄHLROHR

(INVESTIGATIONS CONCERNING ELECTRON TUBE COUNTERS)

By J. N. Hummel

Zeitschrift für Physik, Berlin, vol. 76, No. 7-8, 1932, pp. 483-504.

Principles of operating tube counters used as registering apparatus and as
ans for movements of gas discharges are discussed. Two kinds of discharge,
e glow-spark discharge and the arc-spark discharge are examined. Character-
tics of the impulse during the negative discharge are investigated and results
tained by experiments are explained theoretically. The use of tube counters
r determining the capacity of ionization of penetrating radiation is indi-
ted.--Author's abstract translated by W. Ayvazoglou.

1044) ZUR BESTIMMUNG DER NATUR DER HÖHENSTRAHLUNG DURCH KOINZIDENZMESSUNGEN

(ON THE DETERMINATION OF THE NATURE OF PENETRATING RADIATION BY MEANS OF COINCIDENCE MEASUREMENTS)

By J. N. Hummel

Physikalische Zeitschrift, Leipzig, vol. 33, No. 13, 1932, pp. 503-505.

Hummel describes an apparatus for making coincidence measurements, by which
is possible to determine how far coincidence capacity is dependent upon the
ssibility of ionization, as well to determine the specific ionization.

Arrangements of the apparatus for measurements are shown in two diagrams.
W. Ayvazoglou.

(1045) MESSUNGEN DES RADIUM-EMANATIONSGEHALTE VON KELLERLUFT

(MEASUREMENTS OF THE CONTENT OF RADIUM EMANATION OF THE AIR IN A CELLAR)

By Ekkehard Schmid

eitschrift für Geophysik, Braunschweig, vol. 8, No. 5, 1932, pp. 233-242.

This article deals with the investigation of the content of the air in a
llar with regard to radium emanation. Strong variations of the content of
nation were observed in connection with the drop of pressure. This relation-
ip was still more distinct in investigating the exhalation. It was established
at the variations must be attributed exclusively to the ventilation of the
llar by the exterior air.--Author's abstract translated by W. Ayvazoglou.

(1046) MESSUNGEN DER KOSMISCHEN ULTRASTRAHLUNG ZWISCHEN 50° UND 7° NORDLICHER BREITE

(MEASUREMENTS OF COSMIC RADIATION BETWEEN 50° AND 7° NORTH LATITUDE)

By E. Oeser

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 5, 1932, pp. 242-249.

A description of the results of measurements of radiation carried out by two Kolhörster ionization chambers during a 3-month trip to Central America is given. Two values obtained by one of the apparatus were used only for the comparison of the character of the curves because it was established that the apparatus was not tight. The mean values of the second apparatus varied, owin to the errors in measurement, very unsystematically, within 2.1 per cent; base on this it was concluded that cosmic radiation was constant, at least within these limits, between 50° and 7° north latitude. The values of the residual radiation, cosmic radiation, and earth radiation are given.--Author's abstract translated by W. Ayvazoglou.

(1047) A GAMMA-RAY IONIZATION CHAMBER

By George C. Laurence

Canadian Journal of Research, Ottawa, vol. 7, No. 1, 1932, pp. 103-105.

A description is given of a γ-ray ionization chamber with its accessory electrometer box, suitable for precision measurements of radio-active preparations and for the measurement of the absorption coefficient and specific ionizing powers in air of γ rays.--Author's abstract.

7. UNCLASSIFIED METHODS

(1048) VALUE OF GEOPHYSICS IN MINE EXPLORATION

By C. H. Wilson

The Mining Journal, Phoenix, Ariz., vol. 16, No. 4, 1932, pp. 5-6.

The practical value of geophysical studies as a means of direct assistanc in the solution of modern mining problems is being recognized more and more by mining engineers, geologists, and operators. Geophysical prospecting, in its present state of development, has a definite rôle and fills a definite need ir the preliminary exploration stage of mining enterprise.

By its proper use a logical and economic plan of exploration and develop-
ent can be formulated and carried through. Its use will provide an additional
afeguard to expenditures to be made, and will provide insurance against un-
ecessary risks. By its employment, exploration work can be expedited toward
roductive effort, with attendant saving resulting from the elimination of use-
ess exploratory work.

In short, the economic advantages secured by intelligent employment of
eophysical and associated geological studies in their proper place in the
rogram of mine development, will serve to place mining upon a business basis.
-Author's abstract.

(1049) THE POSITION OF GEOPHYSICAL RESEARCH IN GERMANY

By Oliver P. van Steewen

The Oil Weekly, Houston, vol. 66, No. 5, 1932, pp. 33-37.

The author describes the present extension of geophysical research in
ermany, as well as its late results.

After a brief historical outline on the development of geophysical research
n Germany since 1913, van Steewen notices the great progress made with regard
o the construction of instruments (3-pendulum apparatus, torsion balance with
hree beams, temperature-compensated magnet system, new constructions of geo-
hones, seismographs, etc.). A series of companies carrying out geophysical
ork in Germany is mentioned.

The application of various geophysical methods for the exploration of oil
eds is examined and van Steewen comes to the conclusion that at present none
f the practical geophysical methods has any special advantage, but that only
he particular geological conditions in each case have to be considered in the
orrect selection of the method to be used. If, according to these geological
onditions, several systems are found to be suitable, the economic operation
f any one compared to that of the others would always be decisive. In this
onnection, the electrical method will be increasingly employed in Germany,
erhaps in addition to gravimetric measurements.

The area of oil prospecting in Germany and its extensions in recent years
re discussed.

In conclusion the author mentions that the cost of geophysical research
Germany is considerably lower than in the United States. The North
ropean Co., for instance, quotes its expenses at about R.M. 25 per torsion-
lance station.--W. Ayvazoglou.

(1050) AN ELECTRICAL GENERATOR FOR GEOPHYSICAL SURVEYING

Editorial note

The Engineer, London, vol. 52, No. 3954, 1931, p. 445.

A petrol engine driven alternator supplied for the purposes of geophysical surveying by Haslam and Newton (Ltd.), of Derby, engineers, is illustrated and a brief description of it is given: The weight is only 101 pounds, inclusive of the tubular steel guard and frame and the field regulator. The engine is a Stuart light-weight petrol engine running at 1,880 r.p.m., and the alternator gives single-phase high-frequency current of 553 cycles per second at 80 volts and has a capacity of 350 watts.--W. Ayvazoglou.

(1051) GEOPHYSICAL METHODS DISCUSSED BY EASTERN AMERICAN PETROLEUM INSTITUTE GROUP

Editorial note

National Petroleum News, Cleveland, vol. 24, No. 20, 1932, p. 18.

Practical aspects of geophysics as applied to the fields of northern Pennsylvania and southern New York were presented and discussed at the meeting of the eastern division of the American Petroleum Institute division of production at Willsboro, Pa., May 13 and 14.

K. C. Heald outlined the basic principles on which various geophysical methods operate, with particular emphasis on what can and can not be expected of each instrument.--W. Ayvazoglou.

(1052) OPORTUNIDAD DE LAS INVESTIGACIONES GEOFISICAS PARA BUSCAR ACUMULACIONES DE PETROLEO Y GAS EN ALGUNAS REGIONES DE LA REPUBLICA ARGENTINA

(OPPORTUNITY OF GEOPHYSICAL INVESTIGATIONS FOR DISCOVERING ACCUMULATIONS OF OIL AND GAS IN SOME REGIONS OF THE REPUBLIC OF ARGENTINA)

By Enrique Fossa-Mancini

Boletin de Informaciones Petroliferas Yacimientos e Industrias,
Buenos Aires, vol. 8, No. 77, 1931, pp. 27-37.

The following circumstances are considered:

1. Most favorable conditions (salt and basalt).
2. Geological knowledge of regions to be investigated by geophysical methods.
3. Shortage of oil undertakings at the present time and the necessity of discovering oil in places geologically suitable.

4. Conditions in Argentina with respect to the use of geophysical methods for discovering deposits of hydrocarbons.
5. Opportunities for establishing new geological commissions and sending young Argentineans for studying in foreign universities.

The author concludes that the application of geophysical methods in rgentina at present must be considered amply justified.--W. Ayvazoglou.

(1053) TIME CHANGES OF THE EARTH'S MAGNETIC FIELD

By J. A. Fleming

The Scientific Monthly, vol. 34, June, 1932, pp. 499-530.

This is the first in a series of three lectures concerning the magnetic ield of the earth and its atmosphere, delivered at the Carnegie Institution f Washington on March 8, 1932.

Secular variation, diurnal variation, regular and irregular variations nd magnetic activity, and pulsations are discussed.

The author's conclusion reads as follows:

> This complexity of the magnetic time-change phenomena has baffled attempts at theoretical explanation or hypotheses, although long the field of able and enthusiastic investigators. We may hardly hope in our time to lay down a general theory which will explain the multitude of observed facts or permit us to foretell with any precision future changes. Despite this, magnetic observations have already added materially to our knowledge of the earth's interior, particularly to some of the geological features of its crust. Thus secular-variation changes within the crust indicate an interior more mobile than the exterior layers, not only as a whole but regionally. Even more definite and promising are the results of those magnetic researches which give us also additional information regarding the high atmosphere above the earth.
>
> We must continue looking to observations and to their discussions perhaps more than to pure theory for further advance in knowledge of the causes and laws governing magnetic time changes, as well as for provision of foundations upon which tests may be made of theory. The rapid developments in physics and in atomic physics during the past decade, particularly in ionization, radioactivity, and high-vacuum electrical research, will permit speculations on the origin and changes of the earth's magnetic field, which must materially advance fundamental conceptions of the nature and of the constitution of matter.

The article is illustrated by 29 figures; a list of papers bearing on time nanges in the earth's magnetic field is added.--W. Ayvazoglou.

(1054) COSMIC DISTURBANCES OF THE EARTH S MAGNETIC FIELD AND THEIR INFLUENCE UPON RADIO COMMUNICATION

By Arthur E. Kennelly

The Scientific Monthly, vol. 35, July, 1932, pp. 42-56.

In a lecture delivered at the Carnegie Institution of Washington, on March 15, 1932, which is the second in a series of three lectures concerning the magnetic field of the earth and its atmosphere, reprinted here, Kennelly discusses correlations, found by observation, to exist between (1) the strength of long-distance received radio signals, (2) changes in the apparent height of the ionized layers of the upper atmosphere, (3) changes in the earth's magnetic field, and (4) disturbances on the surface of the sun, as revealed by sunspots.

Headings under which the questions are examined:

The ionized layer or layers in the upper atmosphere.
Troposphere, stratosphere, activation, meteoric and auroral regions of the atmosphere.
Correlation of long-wave transatlantic radio signal strengths with terrestrial-magnetic fields, and with sunspots.
Diurnal range of virtual height of ionized layers on magnetically quiescent days.
Effects of magnetic storms on long-range radio signal reception.
Sunspot cycles and cyles of terrestrial-magnetic activity.
Radio echoes of long delay.

In conclusion the author indicates that it is evident that there are widespread cosmic influences which affect the magnetic field, auroras, the ionized air-layer and radio signals, at or near the surface of the earth.

Twenty-five figures complete the article.--W. Ayvazoglou.

(1055) TIDES IN THE ATMOSPHERE

By J. Bartels

The Scientific Monthly, vol. 35, August, 1932, pp. 110-130.

This is the third in a series of three lectures concerning the magnetic field of the earth and its atmosphere, delivered at the Carnegie Institution of Washington, on March 22, 1932.

Observations on tides in the atmosphere carried out at observatories in Huancayo, Peru, and in Washington, are discussed.--W. Ayvazoglou.

(1056) INVESTIGACION GEOFISICA EN LA CUENCA CARBONIFERA DE VILLANEUVA DE LAS MINAS (SPAIN)

(GEOPHYSICAL INVESTIGATION AT CARBONIFEROUS DEPOSITS OF VILLANEUVA MINING DISTRICT, SPAIN)

By Jose G. Sineriz

International Geological Congress, Compte Rendu of the XV Session,
South Africa, 1929, Pretoria, vol. 2, 1930, p. 607.

Investigation of carboniferous deposits in Villaneuva mining district has een carried out by the author by the electrical, gravimetric, magnetic, and eismic methods. According to his estimation the deposits contain at least 0,000,000 tons of coal. Details on this investigation are given in Sineriz' ook "Los Metodos Geofisicos de Prospeccion," part 6, pp. 427-488 (see Geophys. bs. No. 15).--W. Ayvazoglou.

(1057) ESTUDIO GEOFISICO PREVIO DE LA FALLA DEL GUADALQUIVER

(GEOPHYSICAL STUDY TO PROVE THE EXISTENCE OF THE GUADALQUIVIR FAULT)

By Jose G. Sineriz

International Geological Congress, Compte Rendu of the XV Session,
South Africa, 1929, Pretoria, vol. 2, 1930, pp. 634-637.

Geophysical investigations were carried out by the author to prove the xistence of the great Guadalquivir fault which was supposed to cross the southrn part of Spain from northeast to southwest. Seismic and gravimetric data ere studied. Based on these data the existence of the fault must be considered o be proved, but more geophysical measurements are necessary for obtaining etails.--W. Ayvazoglou.

(1058) ÜBER DAS ELASTISCHE ALTERN VON METALLFÄDEN

(ON THE ELASTIC ALTERATION OF METAL FILAMENTS)

By G. Fanselau

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 5, 1932, pp. 226-232.

The elastic alteration of metal filaments is examined, based on the absoute measurements of declination carried out in the Observatory of Seddin. A istinct exponential expiration of the process with a clear dependance from emperature was observed. It seems that after about three years of the use the lastic disturbance of the filament comes to an end.--Author's abstract transated by W. Ayvazoglou.

(1059) GEOPHYSICAL METHODS AND INSTRUMENTS FOR LOCATING MINERAL DEPOSITS

By R. Leonhardt

Engineering Progress, Berlin, vol. 12, No. 4, 1931, pp. 88-92.

The following geophysical methods of prospecting and instrument used are outlined briefly:

1. The gravimetric method (Eötvös-Sweydar large torsion balance; small Sweydar torsion balance).

2. The magnetic method (Schmidt's horizontal field magnetic balance; Schmidt's vertical field magnetic balance).

3. The seismic method (single-component seismograph; 2-component seismograph; registering apparatus and pendulum instrument of 2-component seismograp

4. Electrical methods: Two various principles of electrical methods of prospecting are stated as follows: (1) Measurement of natural currents generated in the vicinity of deposits such as sulphide ores; (2) determination of the conductivity for artificial currents of the strata to be examined; (3) measurement of disturbances caused in the normal magnetic field of the earth by the introduction of artificial currents; (4) the inductive method, in which an artificial field is formed by induction.--W. Ayvazoglou.

(1060) LES MINES COLONIALES ANGLAISES

(COLONIAL MINES OF ENGLAND)

By Ch. Berthelot

Revue de Métallurgie, Paris, vol. 29, No. 5, 1932, pp. 241-252.

Chapter III of this article deals with the methods of prospecting in the Colonial mines of England.

Main particularities of the following methods used are indicated:

A. Aviation, as an auxiliary means for geological prospecting.
B. Geological methods of prospecting used in the Colonial mines of England in general.
C. Geophysical methods of prospecting: Principles of gravimetric, magnetic, electrical, and seismic methods are outlined. The choice of the method must depend in the first place on the nature of the minerals to be discovered and in the second place on the conditions of the deposits under which these minerals may be found.

The article is illustrated by a series of figures.--W. Ayvazoglou.

(1061) GEOPHYSICAL PROSPECTING IN GULF COAST DISTRICT HAD TO OVERCOME MANY DIFFICULTIES

By W. P. Jenny

The Oil and Gas Journal, Tulsa, vol. 31, No. 8, 1932, pp. 14-16.

Considering the many difficulties which the development of geophysical methods had to overcome, the author says that they probably arose from the fact that during the first few years only a few geologists had sufficient knowledge of mathematics and physics to be of vital assistance to the physicists and engineers, who, on their side, mostly lacked an adequate knowledge of geologic conditions. Most of mistakes arose from these circumstances.

A good number of dry holes on gravimetrical "minima" or "maxima" have sufficiently exemplified the necessity of combining the geological knowledge with the purely physical investigations of a certain area. Diagrams showing three examples of a first and revised interpretation of three prospects are given as illustrations. The spacing of observations must be based on both geological and geophysical evidence, as also must choice of methods. In the paragraph dealing with the comparative costs of survey, Jenny gives the following figures:

A. Reconnaissance survey. The average cost of a torsion balance station in the dry territory of the Gulf coast is $25. Applying the distance of 1 mile between stations and checking in doubtful areas with additional stations, means about $50 per square mile. For marsh and open-water survey the cost would be two or three times as high. Thus a monthly average of 50 square miles could be covered by a small troup, operating three balances, at the expense of $2,500. A seismograph refraction troup covered, at a monthly expense of about $20,000, an average of 200 to 210 square miles. A reflection party making an average of 100 points per month runs up to a cost of about $7,000; 25 square miles could be covered per month per troup.

B. Detail survey. The figures given for reconnaissance surveys multiplied by three-fifths for torsion balance and by two-thirds for reflection shooting might give, according to the author, an approximate idea of detailing a structure by the respective methods.--W. Ayvazoglou.

(1062) NEW FIELD IS INDICATED ON ARIOLA GEOPHYSICAL PROSPECTS IN EASTERN HARDIN COUNTY, TEXAS

By Neil Williams

The Oil and Gas Journal, Tulsa, vol. 31, No. 12, 1932, p. 57.

Considerable attention was being centered recently on the Ariola geophysical prospect where indications point to the opening of another new field. This discovery will, according to the author, serve to turn more attention to the many other geophysical prospects on the coast which so far have not been developed and which offer possibilities of additional oil reserve.--W. Ayvazoglou.

(1063) ESPLORAZIONE GEOFISICA REGIONALE IN SICILIA

(GEOPHYSICAL EXPLORATION IN SICILY)

By R. Fabiani

La Miniera Italiana, Rome, vol. 15, No. 2, 1931, pp. 42-43.

The article gives the distribution of geophysical exploration (gravimetric and magnetic) carried out in Sicily during the year 1930.--W. Ayvazoglou.

(1064) METHODS OF GEOPHYSICAL PROSPECTING

By Donald C. Barton

The Military Engineer, Washington, D. C., vol. 24, No. 137, 1932, pp. 489-497.

General principles of gravitational, magnetic, electric, and seismic metho of prospecting are discussed. The three successive steps common to all the methods are summarized as follows:

1. The mapping of the areal variation at the surface of some physical effects such as intensity of gravity, intensity of terrestrial magnetism, travel time of artificial seismic waves, or the electric and electromagnetic fields.

2. The determination of the subsurface distribution of the corresponding physical property (density, magnetic permeability, elasticity, electrical conductivity).

3. The interpretation of the geologic structure probably corresponding with that distribution of the particular physical property or properties.

A fourth purely geologic step then follows, which is the evaluation of the favorability of that type of geologic structure for whatever mineral substance is being sought.

Under the heading, Methods of lesser importance, Barton mentions briefly e radioactive and the geothermal methods and adds that although not in neral use these methods may be of value under special conditions.

Concerning the "wigglestick methods" the author says:

> The witch wand and the whole associated group of black-art method of prospecting for water and treasure are in no way accepted by geophysicists, although those methods date from far back in antiquity and are still with us. There is no known scientific basis for expecting that they should work.

In discussion of the limitations of geophysical methods, Barton indicates at the usefulness of a geophysical method is limited to situations in which a asonable degree of congruence exists between the distribution of some one of ose basic physical properties and the orebody or structure. It is commonly cepted that the torsion balance and magnetometer and, in a few places, the ismograph are "seeing" down to depths of 2 to 3 miles.--W. Ayvazoglou.

8. GEOLOGY

(1065) ÜBER DIE PHYSIKALISCHEN EIGENSCHAFTEN GEOLOGISCHER KÖRPER

(ON THE PHYSICAL PROPERTIES OF GEOLOGICAL BODIES)

By H. Reich

International Geological Congress, Compte Rendu of the XV Session, South Africa, 1929, Pretoria, vol. 2, 1930, pp. 634-637.

Reich outlines the four properties of rocks which are most important from e viewpoint of geophysics - namely, density, elasticity, magnetizability, and ectric conductivity.

Density. The geophysicist is not interested in the specific weight of ngle grains of minerals alone; the natural volumetric weight of a certain posit is mainly important in gravimetric measurements.

A few figures showing the weight per unit of volume are given as follows:

Rock	Under primary conditions	Piled up
Basalt	2.99	1.71
Granite	2.72	1.55
Sandstone	2.42	1.38

Elasticity of rocks. These figures for the velocities of waves are necessary for the application of seismic methods of prospecting. The velocities of longitudinal elastic waves, as determined theoretically, are given for the following rocks:

	Meters per second
Quartz	About 5,000
Feldspar	Do. 6,500
Rocksalt	4,500
Gypsum	5,500
Calcspar	6,900

The theoretical values agree, according to the author, well with the values obtained from observations in case of rocks formed from solutions, but great differences are observed between these two values if unconsolidated, mechanically formed sediments are concerned.

Magnetizability. The property of magnetizability depends in general on the content of iron in rocks.

Electric conductivity. The electric conductivity of rocks depends not only on the content of good conducting minerals, but also on the porosity, structure, degree and kind of moisture, etc.

The purpose of the paper is to show that the mineral compositions of rocks alone is often not sufficient for the estimation of the physical properties of whole geological bodies.--W. Ayvazoglou.

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9. NEW BOOKS

066) Geoffroy, P., and Charrin, P. Études geologiques et prospections minières par les methodes geophysiques (Geological studies and mining exploration by geophysical methods). Bull. du Service de la Carte Géol. de l'Algerie, Algiers. Series 4, Geophysics, No. 1, 1932, 346 pp. Published by the Government General de l'Algérie. The book is divided into two main parts: Part I, Principles of geophysical methods of prospecting; and Part II, Application of geophysical methods of prospecting. The contents of the chapters are as follows: (1) General remarks; (2) gravitational method; (3) seismic methods; (4) electrical methods: General remarks; electromagnetic methods; (5) potential method and resistivity method; electrical sounding; (6) magnetic method; (7) method of spontaneous polarization; (8) radioactive method; (9) interpretation of the results of measurements; (10) study of horizontal formations; (11) studies of structures; general remarks; studies of structures in general; studies of large sedimentary basins; (12) studies of salt massives and salt bearing anticlines; (13) study of details; (14) prospecting for metalliferous deposits; general remarks; magnetic methods of prospecting; (15) prospecting for minerals possessing conductivity; (16) various problems; (17) measurements made in boreholes; electrical coring; (18) conclusions (conditions under which geophysical methods should be applied; the future of geophysical methods). The book is completed by six annexations (Eötvös' balance; electromagnetic methods of high frequencies; apparatus used for measuring potentials; determination of the thickness of overburden; numerical determination of magnetic anomalies, apparatus and method of measurement; measurement of the content of radon in the air of the ground) and bibliography.

10. PATENTS

(1067) TORSION BALANCE

Hans Haalck, of Berlin-Steglitz, Germany, assignor to the firm:
Exploration, Bodenuntersuchungs and Verwertungs G.m.b.H.,
of Berlin, Germany.

ited States Patent 1,868,010. Patent issued July 19, 1932.

According to the present invention a system is used which, like the Eötvös
rangement, consists only of two beams, but has the advantage over this arrange-
nt that by two measurements it is possible to determine the horizontal gra-
ents of gravity. The beams are not placed at an angle of 180° to each other,
with Eötvös, but at an angle of about 90°.

Claims allowed - 3.

(1068) MAGNETOMETER

Frank Rieber, of San Francisco, California, assignor to
General Electric Co., a corporation of New York.

United States patent 1,863,415. Patent issued June 14, 1932.

This invention relates to a device that responds to magnetic fields, and that can be used to measure the direction and intensity of fields. In a magne meter, a permeable member having high permeability such that a substantial amount of magnetism is induced therein by a magnetic field of substantially the strength of the earth's field, means mounting the member in the field unde test so that magnetism is induced therein by the field, and means for conducti current past the face of the member whereby a dynamic effect is obtained betwe the current and the magnetism induced in the member by the field.

Claims allowed - 4.

(1069) ELECTRICAL PROSPECTING

Charles R. Nichols and Samuel H. Williston, of Dallas, Texas.

United States patent 1,863,542. Patent issued June 14, 1932.

The general object of the present invention is to provide a simple and effective method for determining the depth beneath the earth's surface of an earth layer or body of resistivity different from that of the adjacent earth material.

The method consists in creating an electrical current flow through the earth between energization points, one of which is located at a variable distance below the earth's surface, varying the depth below the earth's surface of the last-mentioned energization point, and comparing the effects of the current flow on potential conditions at the earth's surface when the subsurface energization point is at different depths.

Claims allowed - 4.

(1070) INSTRUMENT FOR DETECTING VIBRATIONS

Olive Scott Petty, of San Antonio, Texas.

United States patent 1,864,214. Patent issued June 21, 1932.

The invention relates to an instrument adapted for use in applied geophysics more particularly to detect or record sound waves produced in the ear and air by the detonation of charges of explosives for the purpose of obtaini data or records which may be studied to determining underlying geological for tions. The instrument for use as a seismograph comprises a thermionic vacuum

be with one element thereof serving as a pendulum steady mass movable in only
e plane, and external means for damping relative movement of the tube and the
eady mass.

Claims allowed - 8.

(1071) MAGNETSYSTEM FÜR MAGNETISCHE WAAGEN

(MAGNET SYSTEM FOR MAGNETIC BALANCES)

Askania-Werke Akt.-Ges. vorm. Centralwerkstatt Dessau und
Carl Bamberg-Friedinau in Berlin-Friedenau.

rman patent 537,143. Patent issued October 29, 1931.

This invention relates to a magnet system for magnetic balances consisting
two magnetic lamellae secured to a central body. This central body is manu-
ctured from a material, preferably iron, the thermal coefficient of expansion
which is equal, or almost equal, to that of the magnetic lamellae.

Claims allowed - 3.

(1072) MAGNETSYSTEM FÜR MAGNETISCHE WAAGEN

(MAGNET SYSTEM FOR MAGNETIC BALANCES)

Askania-Werke A. G. vormals Centralwerkstatt Dessau und
Carl Bamberg-Friedenau in Berlin-Friedenau.

rman patent 545,131. Patent issued February 25, 1932.

This invention, which is an addition to patent 537,143, relates to a magnet
stem for magnetic balances having a hollow central body manufactured from iron
other material, the thermal coefficient of expansion of which is equal to
at of the magnetic lamellae. According to this invention the side faces of
e central body are provided with openings. Owing to this an unlimited contact
th the external air is established, thus a quicker temperature equalization is
tained.

Claims allowed - 2.

(1073) PROCÉDÉ POUR PROJETER SUR UN PLAN DES RÉGIONS DE SOUS-SOL QUI NE SONT PAS HOMOGÈNES AU POINT DE VUE DE LA CONDUCTIBILITÉ ÉLECTRIQUE

(METHOD FOR PROJECTING ON A PLAN THE AREAS OF THE SUBSOIL WHICH ARE NOT HOMOGENEOUS FROM THE VIEWPOINT OF ELECTRICAL CONDUCTIVITY)

Hauser and Co., G.m.b.H. of Germany.

French patent 704,239. Patent issued May 15, 1931.

This invention relates to a method of electrical prospecting in which the equipotential lines measured are compared with the theoretical lines or with those determined for a homogeneous subsoil. The method consists in determining on the measured equipotential lines the respective positions of all the points which are equidistant from the corresponding theoretical equipotential lines or from the lines obtained for a homogeneous subsoil; the distances being measured vertically or horizontally.

Claims allowed - 2.

(1074) PROCÉDÉ PERMETTANT DE DÉCELER LA PRÉSENCE DE CERTAINS CORPS, DANS LE SOL OU AILLEURS, ET D'ÉTUDIER LEUR PROPRIÉTÉS

(METHOD FOR DISCLOSING THE PRESENCE OF CERTAIN BODIES IN THE GROUND OR ELSEWHERE AND FOR STUDYING THEIR PROPERTIES)

Louis Turenne of France (Seine).

French patent 704,353. Patent issued May 19, 1931.

According to this invention it is possible to establish whether a body ha only one kind (positive or negative) of electricity or has both kinds of electricity. Spectra of waves called the "pendulum waves" can be traced by the method to which the invention is related.

Claims allowed - 2.

(1075) PERFECTIONNEMENTS APPORTÉS AUX ENREGISTREURS DE TEMPÉRATURES UTILISABLES DANS LES PUITS PROFONDS ET POUR DES APPLICATIONS ANALOGUES

(IMPROVEMENTS MADE ON TEMPERATURE REGISTERING DEVICES FOR USING THEM IN DEEP WELLS OR FOR SIMILAR PURPOSES)

Anglo-Persian Oil Co. (Ltd.) of England.

French patent 706,947, Patent issued July 1, 1931.

According to this invention the temperature-registering device is inclose in an envelope of cylindrical or other form of strong construction. The velope is lowered into the well by a cable. The adjustment of the device n be made without the necessity of taking it out from the envelope.

Claims allowed - 2.

(1076) PROCÉDÉ POUR LA DÉTERMINATION DE LA DIRECTION ET DU SENS DU PENDAGE DES COUCHES SÉDIMENTAIRES

(METHOD FOR DETERMINING THE DIRECTION AND THE SENSE OF THE DIP OF SEDIMENTARY LAYERS)

ciété de Prospection Électrique (Procédés Schlumberger of France (Seine).

ench patent 708,090. Patent issued July 20, 1931.

This invention relates to a method for determining the direction and the nse of the dip of sedimentary layers. The method consists of transmitting ectric currents into the ground by means of two point-electrodes connected th a source of electricity. Electrical and magnetic fields produced thus on e surface of the ground are studied in order to determine: (1) The small is of symmetry of the electric field by which the direction of the dip is own, and (2) the inclination of the magnetic vector by which the sense of e dip is established.

Claims allowed - 1.

(1077) PROCÉDÉ ET APPAREILS POUR LA RECHERCHE DES GISEMENTS OU DES ROCHES MAGNÉTIQUES

(METHOD AND APPARATUS FOR PROSPECTING DEPOSITS OR MAGNETIC ROCKS)

ciété de Prospection Électrique (Procédés Schlumberger of France (Seine).

ench patent 710,760. Patent issued August 28, 1931.

The method to which this invention relates consists of measuring the adient of the component of the magnetic field by using the induced current oduced in a circuit composed of two similar and parallel windings of differtial connection and jointed to a measuring apparatus (galvanometer or a milar one), this circuit being switched on in the terrestrial magnetic field; y deviation of the galvanometer will show the existence of a local magnetic omaly.

Claims allowed - 1.

(1078) PROCÉDÉ ET APPAREILLAGE POUR LA RECONNAISSANCE GÉOLOGIQUE DES TERRAINS ET PLUS PARTICULIÈREMENT DES COUCHES POREUSES RECOPÉS PAR UN SONDAGE

(METHOD AND APPARATUS FOR GEOLOGICAL EXAMINATION OF THE GROUND, ESPECIALLY OF POROUS LAYERS, PENETRATED BY BORING)

Société de Prospection Électrique (Procédés Schlumberger) of France.

French patent 723,592. Patent issued April 11, 1932.

The present invention refers to a method and apparatus for studying, by measurements of potential inside of the borehole, various layers penetrated by boring (especially porous layers), and determining their depth, thickness and pressure, thus avoiding the mechanical coring.

The apparatus consists of a potentiometer placed above the ground and connected by means of isolated cables with two nonpolarisable electrodes, one of the latter touching the ground near the mouth of the hole and the other being lowered at various depths.

Claims allowed - 1.

(1079) PROCÉDÉ ET APPAREILS DESTINÉS À LA PROSPECTION DU SOUS-SOL

(METHOD AND APPARATUS DESTINED FOR PROSPECTING THE SUBSOIL)

La Société Geophysique de Recherches Minière of France.

French patent 712,477. Patent issued October 2, 1931.

The essential characteristic of this invention consists of utilizing mechanical waves produced by a series of vibrations determined in frequency an amplitude, instead of seismic waves produced by explosion or by fall of weight More closely the invention refers to the application of mechanical waves produced by apparatus using piezo-electric crystals, such as quartz, or by apparatus using magnetic bars put in vibration by a suitable electromagnetic influence, according to the phenomena described by Page, Delezenne, Marian, Matteuchi, and others.

Claims allowed - 13.

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UNITED STATES BUREAU OF MINES
Scott Turner, Director

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GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1080) THE CONNECTION BETWEEN THE EÖTVÖS MAGNITUDES

By O. F. T. Roberts

Nature, London, vol. 130, No. 3272, 1932, p. 94.

Concerning the connection between the Eötvös magnitudes, Roberts says that in the problem of locating subterranean anomalies of density, the Eötvös balance measures two quantities; the horizontal gravity gradient and the difference between the principal curvatures of the level surface at the point of observation. In the 2-dimensional case these reduce to U_{xz} and $-U_{xx}$, denoted by G(x) and K(x), respectively. According to Roberts, in all treatments of the subject seen by him, G(x) and K(x) appear to be considered independent of one another. In this note the author shows that there is a one-to-one relation between the two functions - namely, that they are conjugate trigonometrical integrals of one another. Formulas are given.--W. Ayvazoglou.

(1081) SUBMARINE GRAVITY SURVEY IN THE BAHAMAS

Editorial note

Nature London, vol. 130, No. 3277, 1932, pp. 285-286.

This note concerns the expedition carried out by the U. S. Submarine S.48 with Dr. Vening Meinesz on board, for geophysical exploration in the Bahamas. The ship left Guantanamo, Cuba, on February 7, 1932. In the course of the next two months a cruise of some 4,000 miles was made and a large number of soundings by the sonic and by the supersonic apparatus was made, and the force of gravity was determined at 53 stations. The results of the expedition are likely to yield valuable information, not only as to the history of the region, but also in the sphere of tectonics, or the theory of present-day processes in the more active regions in the earth's crust.--W. Ayvazoglou.

(1082) DIE SCHWERKRAFT IN NORDAMERICA UND WESTEUROPA

(GRAVITATION IN NORTH AMERICA AND WEST EUROPE)

By F. Ackerl

Gerlands Beiträge zur Geophysik, Leipzig, vol. 36,
No. 2/3, 1932, pp. 155-170.

According to investigations made by the author, the gravity value in North America is smaller than that in west Europe on the same parallel. The conditions for several parallels between the latitudes $\varphi = 30^\circ$ and $\varphi = 50^\circ$ are explained by applying gravity values reduced to that at sea level according to A. Prey's method. No conclusions concerning the isostatic or nonisostatic structure of the earth's crust could be derived from the existence of gravity differences.--Author's abstract translated by W. Ayvazoglou.

(1083) A METHOD FOR TESTING AIRY AND PRATT ISOSTASY

By William Bowie

Gerlands Beiträge zur Geophysik, Leipzig, vol. 36,
No. 2/3, 1932, pp. 171-176.

Although there has been much research in the field of isostasy during the last decade and it is believed by most of the investigators that isostasy in its general aspects has been proved, Bowie says that much more remains to be done and the scientists should try to learn: (1) Whether the compensation of the topography is distributed uniformly with respect to depth, and directly under the topographic feature; (2) the extent of the cross section of the imaginary block of the earth's crust, which may be independently in equilibrium; and (3) whether the compensation extends to a uniform depth or whether it varies with the difference in the height of the topography.

The choice between the Pratt and Airy hypotheses is discussed, based on the data obtained from gravity stations in the United States, Canada, and Mexico.--W. Ayvazoglou.

(1084) DER HEUTIGE STAND DER ISOSTASIEFRAGE

(PRESENT STATUS OF THE QUESTION OF ISOSTASY)

By W. Heiskanen

Gerlands Beiträge zur Geophysik, Leipzig, vol. 36,
No. 2/3. 1932, pp. 177-205.

After a brief historical outline, Heiskanen discusses the present status of the question of isostasy under the following headings:

1. Depth of the compensation surface (Ausgleichfläche).
2. Thickness of earth's crust.
3. R. Schwinner's latest works.
4. Vening Meinesz' latest works.
5. Discussion concerning gravity anomalies and geoid undulations.
6. Discussion concerning the elliptic form of the earth equator.
7. Pratt or Airy.

In conclusion, Heiskanen enumerates the statements which can be considered to be proved by the isostatic investigations carried out so far, and mentions questions the decisions of which are still left open. Bibliography is added. --W. Ayvazoglou.

(1085) ON ~~THE~~ FIGURE OF THE EARTH

By Harold Jeffreys

Gerlands Beiträge zur Geophysik, Leipzig, vol. 36,
No. 2/3, 1932, pp. 206-211.

The author refers to a recent paper, published by him in Gerlands Beiträge, vol. 31, No. 4, 1931 (see Geophys. Abs. 33), in which he showed that there is a relation between Stokes' solution and the theorem of Green's equivalent stratum.

In this article Jeffreys gives a mathematical treatment of the question, which in his opinion is somewhat more convenient.--W. Ayvazoglou.

(1086) ZUR ABSCHÄTZUNG VON GEOIDUNDULATIONEN UND ABPLATTUNG

(ON THE ESTIMATION OF GEOID UNDULATIONS AND THE OBLATENESS)

By Karl Jung

Gerlands Beiträge zur Geophysik, Leipzig, vol. 36,
No. 2/3, 1932, pp. 212-239.

According to the author this article serves to supplement and correct F. Ackerl's article, "The Geoid." (See Geophys. Abs. 28, p. 195.)

The author's abstract reads as follows:

> In his treatise on "The geoid," F. Ackerl has computed the warping of the geoid and the oblateness of the spheroid, basing the computation on gravity anomalies reduced by the method of Prey. For several reasons, however, he arrives at wrong results.
>
> The formula applied for computing the warping of the geoid, which he has taken over from Bruns and Hopfner was incompletely derived by Bruns. As shown by Helmert and Lambert, a term must be added in order to express the gravity effect of masses situated directly above and below the geoid point.
>
> Clairaut's theorem is not applicable to values reduced by the method of Prey. A term must be added owing to the masses outside the geoid.

In drafting the chart of the gravity values, island stations were used in order to find the oceanic gravity. Owing to the fact that considerable positive anomalies were measured on island stations and small anomalies only were established by Vening Meinesz on the sea in the neighborhood of islands, island gravity values can not be taken to represent oceanic gravity. The large oceanic anomalies arrived at by Ackerl are therefore wrong.

Thus he is likewise mistaken in the gravity formula. Basing the computation on Ackerl's values of the northern hemisphere only, where large positive ocean anomalies are less prevalent, a better formula is obtained.

Assuming isostasy to be extant, it will be possible to correct Ackerl's large values of the warping of the geoid. We then arrive at small values with an amplitude of almost the limit to be expected in case isostasy exists.

Only through the knowledge of density and thickness of the masses outside the geoid and the mass anomalies below the geoid we are enabled to correct Ackerl's values. The masses outside the geoid are generally known well enough. Density and thickness of mass anomalies below the geoid are usually computed on the base of Bouguer's anomalies. Owing to the inaccuracies of Bouguer's reduction we arrive, instead of at the actual warping of the geoid, at values depending only on the topographic reduction in geoid points, therefore at those of entirely incidental character. Thus even the improved formula of Hopfner and Ackerl is hardly applicable for practical computation.

Taking into account the masses outside of the geoid, omitted by Ackerl, his gravity formula will show an oblateness equal to 1/278.1, instead of the value 1/275.5 computed by him. Basing the computation on Ackerl's gravity values of the northern hemisphere only, the result is 1/287.4, and it is to be expected that, if the mistaken large positive ocean anomalies are left out of the account, the result will run up nearly to the well-known value of about 1/297.

On pages 240-241 of the same magazine Ackerl's explanation of his standpoint is published under the title Erwiderung auf K. Jung's Abhandlung "Zur Abschätzung von Geoidundulationen and Abplattung" (In response to K. Jung's article, "On the estimation of geoid undulations and the oblateness").--
M. Ayvazoglou.

(1087) ZUR FRAGE NACH DEM ISOSTATISCHEN MASSENAUSGLEICH IN DER ERDRINDE

(CONTRIBUTION TO THE QUESTION OF THE ISOSTATIC COMPENSATION OF MASSES IN THE EARTH CRUST)

By A. Prey

Gerlands Beiträge zur Geophysik, Leipzig, vol. 36,
No. 2/3. 1932, pp. 242-268.

As a supplement to the investigations for a nonisostatic earth, published in vol. 29 of this journal (see Geophys. Abs. 26, p. 138), a similar investigation for the isostatic earth follows now. Supposing a complete isostatic compensation based on the hypothesis of Pratt, the form of the geoid, the gravity on the earth's surface, and the results of reduction by the usual methods are given. The undulations of the geoid are very small, not more than +47.5 meters in Central Asia and -24.9 meters in the center of the Pacific Ocean. The ellipticity of the equator becomes ±6 meters. The values of gravity reduced by the free-air method are pretty close to normal. Applying the Bouguers' method one finds a deficit of gravity below the continent and a surplus on the surface of the oceans, a phenomenon from which the idea of isostasy was developed.

It is showed that the values of gravity reduced by the free-air method are useful for determining the geoid, except those undulations which are represented by spherics of the first order. The same results were obtained recently by J. Jeffreys in a more general manner.--Author's abstract.

(1088) MODERNIZATION OF OLD STERNECK-PENDULUM APPARATUS FOR RELATIVE GRAVITY DETERMINATIONS

By K. Wold

Gerlands Beiträge zur Geophysik, Leipzig, vol. 36,
No. 2/3. 1932, pp. 269-274.

After a brief description of the arrangement of the modernized Sterneck-pendulum apparatus for relative gravity determinations, Wold gives in this article some data obtained from experimental work in the comparison station and a few field stations.

The observations, calculations, and accuracy obtained are illustrated by an example.

The author concludes with some cost figures. The modernization of the pendulum apparatus, including some experimental work and reserve parts, amounts to about $350 and the radio-registrator with outfit to about $350.

A detailed description of the apparatus is given by G. Jelstrup in the article "Description of the converted Sterneck-pendulum apparatus" (see following).-- W. Ayvazoglou.

(1089) DESCRIPTION OF THE CONVERTED STERNECK-PENDULUM APPARATUS

By G. Jelstrup

Gerlands Beitrage zur Geophysik, Leipzig, vol. 36,
No. 2/3, 1932, pp. 275-279.

The modernizing of the old Sterneck apparatus in order to make it useful or gravity measurement answering the modern standard of exactness in such easurements consisted, according to the author, mainly in correcting the ollowing defects of the old apparatus:

1. The high damping of the oscillations due to the atmospheric pressure in which the pendulums are swung.
2. The great influence of the temperature on the oscillation period due to the high expansion coefficient of the bronze metal in the pendulums.
3. The errors due to the personal observing of the light flashes in the flash box.
4. The errors caused by the clock corrections.

A detailed description accompanied with schematical designs is given. W. Ayvazoglou.

(1090) ON THE REPRESENTATION AND CALCULATION OF THE RESULTS OF GRAVITY SURVEYS WITH TORSION BALANCES

By A. O. Rankine

The Proceedings of the Physical Society, London, vol. 44,
part 4, No. 244, 1932, pp. 465-473.

This paper deals with an alternative and, it is believed, superior method f indicating the functions of the Eötvös torsion balance, and of calculating hose quantities, depending upon the distortion of the earth's gravitational ield, which the balance measures. Remarks are also made on the representaion of these quantities, -- the so-called gravity gradient and horizontal irective tendency, -- and a convenient method is indicated of applying raphically the necessary corrections for the effects of earth's rotation and rregularity of the surface of the ground.--Author's abstract.

(1091) SOME OBSERVATIONS WITH A GRAVITY GRADIOMETER

By A. O. Rankine

Proceedings of the Physical Society, London, vol. 44,
part 4, No. 244, 1932, pp. 474-493.

This paper gives an account of a series of observations with a Shaw and ncaster-Jones gravity gradiometer, during which it was discovered that very persistent, although small, electric charges could be developed on the mica ring forming part of the oscillation-damping system. The origin of these charges has not yet been ascertained precisely, but one of them has been located and measured approximately by suitable manipulation of the instrument. It is shown that such charges, which may persist for weeks, may not arouse suspicion, although in fact they lead to spurious results in the normal use of the instrument. Thus the apparent gravity gradient determined by an instrument insidiously charged may have errors of magnitude much larger than the true gradient, and errors of direction of many degrees. It is shown that the effect can be eliminated by introducing into the instrument a sufficient quantity of a suitable ionizing agent, such as mesthorium. This precaution, which can be adopted readily in both old and new gradiometers, results in a notable improvement in the accuracy and reliability of the instrument.--Author's abstract.

(1092) INVESTIGATIONS ON GRAVITY VARIOMETER METHOD IN UNDERGROUND

By N. Kumagai

Japanese Journal of Astronomy and Geophysics, Tokyo,
vol. 9, No. 3, 1932, pp. 141-207.

By using Schweydar's small gravity variometer (Kleine Askania Drehwage) observations were made in the crosscuts and adit level of the Ashio Copper Mine, Japan. For all these observations except one, some or all of the images indicating the rest positions of the balances were missing on the photographic plates, whereas the images indicating the temperatures in the innermost spaces containing the balances and the fixed images from the fixed mirror were always observed. When observations were tried in open field, however, the images were always shown completely. After close investigations, the following deduc tions were made:

1. Some of the missing images lie naturally outside the photographic plate on account of large rotations of the balances caused by the very high values of the curvature and gradient vectors existing in the crosscuts and adit level. The accuracy of the instrument adapted for underground observations may be reduced to half or less that for ordinary open-field observation If this were realized, the images could be kept from deviating outside the photographic plates.

2. The absence of the rest of the missing images is reasonably attribut to the capillary effect of the droplets formed by condensation of the penetrated warm saturated water vapor which surrounds the instrument, making the balances adhere to the internal walls of the instrument. Forces due to capillarity are not only experimentally proved but also theoretically calcula Other unknown phenomena are explained from this standpoint of capillary effec A method is proposed to prevent penetration and condensation of such vapor.

At the end of this paper are given diagrams showing how curvature and adient vectors due to the rocks of side walls are distributed inside a long rosscut. Further, the directions of the first azimuth of the balance are vestigated to ascertain those which reduce the effect of the rocks of side lls to a minimum. The influences of the third derivatives of gravitational tential upon the instrument of Z-type, to which our Schweydar's small avity variometer belongs, are also examined.--Author's abstract.

(1093) EÖTVÖS TORSION BALANCE

By Donald C. Barton

Bulletin of the American Physical Society, New York, vol. 6,
No. 7, 1931, p. 20.

The following abstract of this paper, presented at the joint session of e American Physical Society, Section E of the American Association for the vancement of Science, and the American Society of Petroleum Geophysicists New Orleans on December 30, 1931, is given in the bulletin:

> The presence of an extra heavy (or light) body in the subsurface warps the level surfaces up (down) over the body and the lines of the vertical toward or into (away from) itself. The Eötvös torsion balance consists of a calibrated platinum-iridium torsion wire which supports a beam of negligible weight; a weight is attached to one end of the beam and a second weight is suspended from the other end. Curvature of the level surfaces and curvature of the vertical each produce at the two weights horizontal components of gravity which are respectively equal and opposite in actual but the same in rotational direction. The torque produced by the curvature of the vertical is a function of the difference of the radii of curvature of the level surface in the directions of major and minor curvature. There has been only one slight important improvement of the torsion balance in the past 25 years. There is room for improvement in the avoidance of temperature effects and in speeding up in the time necessary for observation. The mathematics of the torsion balance and of the gravitational effects of simple geometrical bodies is simple and developed. The main field of research with the torsion balance lies mainly in the geological-geophysical field of interpretation, although there are still unsolved problems in the mathematics of interpretation.

2. MAGNETIC METHODS

(1094) MAGNETIC DECLINATION IN THE UNITED STATES IN 1930

By Daniel L. Hazard

U. S. Department of Commerce, Coast and Geodetic Survey,
Washington, D. C., Serial 540, 1932, 41 pp., 1 chart.

The object of this publication is to supply information on the knowledge compass variation (magnetic declination) and its changes. The distribution of the magnetic declination and its annual rate of change in the United States for the beginning of 1930 are shown graphically on an isogonic chart.

Contents of the article: (1) Introduction; (2) definition of terms; (3) compass surveys; (4) secular change; (5) derivation of secular change tables; (6) use of secular change tables; (7) secular change tables; (8) construction of isogonic chart; (9) lines of equal annual change; (10) available data; (11) accuracy of isogonic chart values; (12) diurnal variation; (13) determination of the true meridian; (14) determination of the magnetic declination.--W. Ayvazoglou.

3. SEISMIC METHODS

(1095) EXPLOSIVES USED TO PRODUCE EARTH TREMORS ARTIFICIALLY

Editorial note

Science News Letter, Washington, vol. 20, No. 545, 1931, p. 191.

The experiments carried out in Yosemite National Park by the Carnegie Institution of Washington and the California Institute of Technology, Pasadena are briefly described.

Two methods of producing tremors were used. A tunnel, more than 2,300 feet long, was dug into the cliff east of Bridal Veil Falls. In this tunnel, several hundred feet underground, several hundred pounds of dynamite were exploded twice daily. Vibrations were registered on instruments many miles distant from the source of the disturbance. Smaller charges were exploded on the surface, and the vibrations set up in the solid granite were recorded with instruments placed some thousands of feet away.

The following three problems were studied: (1) To determine the velocities of earthquake waves in the different kinds of granite; (2) to determine the effect of a vertical-walled canyon or valley on earthquake waves when they travel approximately at right angles or across the valley; and (3) to record the echo in the rock wave by reflection from the bottom of the granite itself.--W. Ayvazoglou.

(1096) INSTRUMENT WITH PENDULUM MEASURES QUAKE FORCE

Editorial note

Science News Letter, Washington, vol. 20, No. 535, 1931, p. 24.

This is a brief review of J. A. Anderson's paper presented before the seismologists meeting in Columbia, S. C., recently.

The paper concerns an instrument that will measure the force of an earth-ake. It consists essentially of a pendulum free to swing in a given plane t normally resting against a stop. When an earthquake strikes it the pendu-m swings away from its stop. This opens an electric circuit and causes a maphore on top of the instrument to drop. It is planned to use seven such ndulums on each installation, each set to indicate a different earthquake rce.--W. Ayvazoglou.

(1097) GIANT BLAST FELT AS QUAKE BY DISTANT SEISMOGRAPHS

Editorial note

Science News Letter, Washington, vol. 21, No. 572, 1932, p. 192.

A short account of the blast in a limestone quarry near Manistique, Mich., given. The velocity of propagation of the earthquake waves set up by the plosion was determined based on the records obtained in the seismograph ations at Canisius College, Buffalo, the University of Wisconsin, as well that at the Georgetown University, Washington, D. C. Still and motion ctures of the explosion were taken for further study by the U. S. Bureau Mines.--W. Ayvazoglou.

(1098) SUBMARINE CRUISE YIELDS DATA ON EARTHQUAKES

Editorial note

Science News Letter, Washington, vol. 21, No. 573, 1932, p. 209.

Brief information is given on the data of gravity determinations obtained ring the 33 days' cruise of Submarine S-48 among the West Indies begun on bruary 7. Fifty-five dives were made to approximately 70 feet under the rface. Soundings were made every 15 minutes, coincidentally with the avitation tests.

Dr. Meinesz' apparatus was used. According to the leaders of the expedi-on, Dr. R. M. Field and Dr. F. A. Vening Meinesz, it will be three months fore the field data and preliminary calculations made are computed. From e isostatic reduction of these it can be found if certain blocks are in or t of balance and whether they should go up or down.--W. Ayvazoglou.

(1099) PRODUCTION AND RECORDING OF CONTINUOUS SEISMIC WAVES IN THE GROUND

By W. R. Ransome

Bulletin of the American Physical Society, New York,
vol. 6, No. 7, 1931, pp. 9-10.

This paper was presented at the annual meeting of the American Physical ciety held in New Orleans, La., on December 29-30, 1931. The abstract of e paper given in the bulletin reads as follows:

The first recorded data on the transmission of continuous seismic waves of variable frequency are presented. A discussion of the apparatus used and method of setting up waves in the ground and recording them is given. The records indicate that the velocities of the continuous waves are not the same as those of the first impulses from impact (dynamite) excitation; that interference patterns exist, and that the ground may be resonant to some frequencies. Feasibility of using the method of continuous waves in geophysical exploration is suggested.

(1100) SEISMOLOGICAL DISCOVERY AND PARTIAL DETAIL OF THE VERMILLION BAY SALT DOME

By E. E. Rosaire and O. C. Lester, Jr.

Bulletin of the American Physical Society, New York,
vol. 6, No.7, 1931, p. 22.

An abstract of Rosaire and Lester's paper is published in this number of the bulletin:

> This dome is of interest because it was one of the first discovered by a seismological exploration conducted entirely by boats and over water. The original interpretation of the data and the agreement with results of well drilling are presented, with criticisms in the light of later experience.

(1101) SOME SPECIAL CASES OF THE REFLECTION AND REFRACTION OF SEISMIC WAVES BETWEEN SIMILAR ROCKS, WITH APPLICATION TO THE STUDY OF CRYSTAL LAYERS BY DISTANT QUAKES

By Louis B. Slichter and V. Gabrilovitch Gabriel

Bulletin of the American Physical Society, New York,
vol. 6, No. 7, 1931, p. 22.

This paper was reported at the annual meeting of the American Physical Society held in New Orleans on December 29-30, 1931. The abstract given below is published in the bulletin of the Society:

> In the first part of this paper, some particular cases of the reflection and refraction of plane elastic waves at the interface between similar rocks are computed after the method of C. G. Knott. In the second part the results of these computations are utilized in examining the possibility of study of a layered upper crust by means of distant, rather than local, earthquakes. For a layered crust of a type often assumed, it results that the transformed SV wave, SP $\bar{P}$ should produce surface amplitudes about 35 per cent as large as those due to the direct wave, SS $\bar{S}$, when the equicentral distance is about 30°. The time lead of the derived wave SP $\bar{P}$ over SS $\bar{S}$ is here about

seven seconds. The identification of this wave appears to offer difficulties; but should its recognition prove to be practicable, the study of crystal structure in regions which do not enjoy an abundance of local shocks will obviously be much facilitated.

(1102) HORIZONTAL PENDULUM SEISMOGRAPH

By S. Higuchi

Tohoku University Scientific Reports, Tokyo, No. 20,
December, 1931, pp. 764-781.

In the present paper the motion of the recording pin of the seismograph the arrival of the seismic wave and the effects of it upon the seismogram re studied. For the purpose of practice, the actual form and dimensions of e lever of Omori's seismograph were used. A method is proposed by which e characteristics of the incident seismic wave, that is, the frequency, me constant, and amplitude of the wave, etc., can be determined.--Author's bstract.

(1103) EARTH AMPLITUDES IN SEISMIC PROSPECTING

By Maurice Ewing

Bulletin of the American Physical Society, New York,
vol. 6, No. 7, 1931, p. 21.

An abstract of this paper, delivered before the annual meeting of the erican Physical Society, held on December 29-30, 1931, in New Orleans, is ven in the bulletin. It reads as follows:

> 1. A relation between the time-distance curve and the earth amplitude-distance curve is derived upon the basis of the ray equations of geometrical optics. The possibility of using this relation in seismic prospecting is pointed out.
>
> 2. The earth amplitude-distance curve is computed for several hypothetical subsurface structures consisting of two layers in each of which the velocity of propagation of seismic waves is a linear function of the depth.

(1104) ZUR EXPERIMENTELLEN SEISMIK UND DEREN ANWENDUNGEN

(CONTRIBUTION TO THE EXPERIMENTAL SEISMIC AND ITS APPLICATIONS)

By Ferdinand Müller

Gerlands Beiträge zur Geophysik, Ergänzungshefte fur angewandte
Geophysik, Leipzig, vol. 3, No. 1, 1932, pp. 126-136.

The author reviews different cases and derives corresponding formulas wit regard to the qualitative and quantitative results of seismic observations without the use of time-distance graphs.

A series of practical examples is discussed and remarks are made on the way the method has to be used.

Part 1. Qualitative observations on seismograms.

Part 2. Quantitative observations on seismograms without the use of time-distance curves.

Six figures and a list of literature are added.--W. Ayvazoglou.

(1105) REFRACTION PROFILES AS AIDS TO THE REFLECTION METHOD

By H. Rutherford

Bulletin of the American Physical Society, New York,
vol. 6, No. 7, 1931, p. 22.

The following abstract of Rutherford's paper presented on December 30, 1931, at the annual meeting of the American Physical Society, held in New Orleans, is given in the bulletin:

> The relationship between the time-distance curve for refracted waves and that for reflected waves is discussed. It is shown that a refraction profile is of great assistance in identifying reflections on the records and also in determining which horizon is producing the reflections. Reflection records and time-distance graphs are shown to illustrate these points.

4. ELECTRICAL METHODS

(1106) LAST ACHIEVEMENTS IN ELECTRICAL PROSPECTING (IN RUSSIAN)

By D. Jabrev, A. Parfenov and K. Verpatov

Azerbaidzhanskoe Neftianoe Khoziaistvo, Baku, vol. 12,
No. 7, 1932, pp. 1-12.

The authors discuss the new achievements of electrical prospecting and th possible rationalizations and reconstructions in some main domains of oil industry:

1. Investigation of water-flows. Apparatus for measuring resistivity, eveloped by Schlumberger -- method of carrying out the work by this apparatus nd a description of the results obtained in a series of boreholes are given.

2. Determination of the crookedness of boreholes and orientation accordng to the cardinal points by means of Schlumberger's magnetic inclinometer. he results are shown in a series of graphs.

3. Application of the electrical coring and determination of positions of he apparatus at various points of the deposit. Examples are illustrated by igures.

4. Some additional data. Possibilities for the application of an lectrical thermometer are discussed.--W. Ayvazoglou.

(1107) LA GEOFISICA EN LA BUSQUEDA DE AQUA

(SEARCH FOR WATER BY GEOPHYSICAL MEANS)

By D. Chahnazaroff

Petroleos y Minas, Buenos Aires, vol. 12, No. 136, 1932, pp. 8-10.

In this article the author discusses the possibility of prospecting for ater by the application of geophysical methods in places in Argentina where series of unfavorable geological and atmospheric conditions exists.

According to the author electrical prospecting by the method of alterating electrical current must be considered the most applicable one.--uthor's abstract.

(1108) LUFTELEKTRISCHE MESSUNGEN IM INNSBRUCKER MITTELGEBIRGE

(MEASUREMENTS OF ATMOSPHERIC ELECTRICITY IN THE INNSBRUCK CENTRAL MOUNTAINS)

By V. F. Hess and Walter Kosmath

Gerlands Beiträge zur Geophysik, Leipzig, vol. 36,
No. 4, 1932, pp. 439-451.

In Lans (Mittelgebirge near Innsbruck, Tyrol) numerous determinations of e electric conductivity and the potential gradient in the atmosphere were rformed from July to September, 1926. The results give a good characteristic an Alpine country station. The relations between the atmospheric-electrical d meteorological factors are thoroughly discussed.--Author's abstract.

(1109) OIL PROSPECTING IN KENTUCKY BY RESISTIVITY METHODS

By J. H. Swartz

U. S. Department of Commerce, Bureau of Mines, Washington, D. C.,
Technical Paper 521, 1932, 23 pp.

The present paper presents results of a study of resistivity measurements as applied to petroleum prospecting. The author's general summary reads as follows:

> The results of a series of resistivity surveys made near White Chapel, Warren County, and Legrande, Hart County, Ky., demonstrate that oil and gas pools may be recognized and their boundaries delimited by the partitioning method. Furthermore, the depths at which the oil or gas occurs and the number of producing horizons can be determined under favorable conditions with good approach to exactitude. Although depths of only 800 feet have so far been attempted, the clarity of the phenomena indicates that a much greater range will prove feasible.
>
> The accuracy with which strata of characteristic resistivity may be located permits tracing of the strata from one station to the next with the resultant possibility of using such horizons for working out geological structures and structural data.
>
> Many geophysicists have supposed that low-resistivity zones would shield underlying beds to such an extent that subjacent oil and gas horizons could not be detected. This supposition is shown to be incorrect. As yet very little is known about the nature of such low-resistivity beds.
>
> The necessity of disentangling depth effects from those produced by the horizontal movement of the current stakes during measurements is pointed out, and methods of procedure are discussed.
>
> Pipe lines in the area measured constitute a very disturbing factor. They have two effects: (1) They smooth out individual curves, ironing out the resistivity breaks and peaks which elsewhere may lead to the detection and location of oil and gas sands, etc. (2) They lower the average resistivity of the whole curve. As this effect may be recognized, oil and gas pools may still be outlined by this method.

The author clearly recognizes that from the classical or theoretical viewpoint the resistivity curves should show no sharp changes and that boundaries supposedly could not be differentiated in this way. Previous observations, however, made upon artificial beds (Swartz, J. H., Resistivity measurements upon artificial beds, see Geophys. Abs. 23) seem to bear out the experimental fact that such sharp changes really do occur. How much significance they possess and how far interpretations of this nature can be useful are at this time still open questions. That it does not admit of easy mathematical theoretical delineation is unquestionably admitted. Under these conditions a large amount of experimental evidence under diverse geological conditions may help to clarify this problem.

Contents of the article:

Areas covered.
Topography and geology (oil sands; nature of oil).
Method of measurement (theory; application).
Results of resistivity surveys (White Chapel area;
    Legrande pool).
General conclusions (feasibility of direct detection
    of oil and gas; accuracy of depth determinations;
    effect of stratigraphic complexity; depths attained
    and attainable; shape of curves; significance of repetition of minor fluctuations; tracing strata --
    determining geological structures; disentangling
    depth and horizontal effects; shielding effect of
    low-resistivity strata; nature of low-resistivity
    beds; effect of pipe-lines on measurements; determination of location and boundaries of dry and
    producing areas.
General summary.
Bibliography.
Sixteen illustrations complete the article.

(1110) ELECTRICAL METHODS FOR ESTIMATING THE CORROSIVENESS OF SOILS

By Scott Ewing

American Gas Association Monthly, New York, vol. 14, No. 8, pp. 356-361.

The present investigation was undertaken with the object of learning something about the accuracy of various devices for testing corrosiveness.

Headings of the article:

1. Introduction.
2. Electrical tests for soil corrosiveness.
3. Galvanic currents between iron and copper electrodes in soil:
    (a) Results of field measurements;
    (b) normal and abnormal time-current curves;
    (c) comparison of measurements of galvanic current and conductivity with results of a laboratory corrosion test.

4. Polarization measurements:
   (a) Measurement of total polarization;
   (b) measurement of separate polarization at anode and cathode.
5. Summary.

The author's summary reads as follows:

Field measurements of galvanic currents between iron and copper electrodes in a few classes of soils indicated that the most important factor influencing the current was the conductivity of the soil. Variations in voltage between iron and copper in the soils have some influence on the galvanic current. Within the limits of experimental error in these field measurements polarization was a function only of the soil conductivity. Measurement of galvanic current and of soil resistivity roughly indicated the corrosiveness of the soils tested, but laboratory trials showed that this would not be true for all types of soils.

The application of polarization measurements in the study of the corroseiveness of soils is suggested and methods are described for estimating the total polarization and the polarization on the separate electrodes in soils.

Five figures and two tables of observations are added.--W. Ayvazoglou.

(1111) APPLICATION DES MÉTHODES DE PROSPECTION ÉLECTRIQUE À L'ÉTUDE DES FONDATIONS DE HAUTS BARRAGES ET DES OURVAGES ANNEXES

(APPLICATION OF ELECTRICAL METHODS OF PROSPECTING TO THE STUDY OF FOUNDATIONS OF HIGH BARRAGES AND TO SIMILAR WORKS)

By M. Lugeon and C. Schlumberger

Le Génie Civil, Paris, vol. 101, No. 6, 1932, pp. 134-137.

The authors describe the results of their study of the application of electrical methods of prospecting in connection with the construction of the Sarrans barrage on the river of La Truyère, a tributary of the Lot, in the Department of Aveyron.

The existence of a relationship between the specific electrical resistance of granite and the degree of its alteration, as well as permeability with regard to water, is shown.

This was proved by about 500 measurements. A relationship between resistivities and coefficients of absorption of water was besides proved by measurements made in boreholes.

The authors are of the opinion that the knowledge of this relationship nay be of interest in all constructions in which the question of water-tightness is involved and that electrical prospecting is capable of rendering service in studying places assigned for constructing barrages, canals, etc.--W. Ayvazoglou.

(1112) APPLICATION DE LA PROSPECTION ÉLECTRIQUE A L'ÉTUDE DES PROJETS DE TUNNELS ET DE BARRAGES

(APPLICATION OF ELECTRICAL PROSPECTING TO THE STUDY OF PROJECTS OF TUNNELS AND BARRAGES)

By C. Schlumberger and E. G. Leonardon

Annales des Ponts et Chaussées, Paris, vol. 102, part 1, No. 2, pp. 271-289,

After a brief description of the methods by which the conductivity, or rather the electrical resistivity of various rocks, can be determined, the authors give in this article some examples of practical problems successfully solved by application of these methods:

1. Geological study for digging a tunnel, 4,000 meters long, near the station of Bridge River, British Columbia.

2. Preliminary studies for constructing a barrage on the St. Lawrence River near Morrisburg, Ontario, Canada.

3. Study of a plan for a tunnel in the valley of the Lièvre River, near Masson, Quebec, Canada.

By these examples the authors showed that measurements of the resistivity of the subsoil may be of great aid in geological reconnaissance before the engineering work is started, especially owing to the main advantages of the electrical methods of prospecting -- rapidity and small cost.

Maps showing the results obtained are added.--W. Ayvazoglou.

5. RADIOACTIVE METHODS

(1113) A DIRECT-READING γ-RAY ELECTROSCOPE

By L. G. Grimmett

The Proceedings of the Physical Society, London, vol. 44, part 4, No. 244, 1932, pp. 445-450.

The dead-beat, direct-reading, γ-ray electroscope, a linear scale raduated in milligrams of radium, is described. It is a combination of a pecial ionization chamber, Lindemann electrometer and high resistance, and llows the estimation, in less than three seconds, of the activity of small γ-ray sources of the order 1 mg. Ra with an accuracy of $\frac{1}{2}$ per cent on a ull-scale deflection.--Author's abstract.

6. GEOTHERMAL METHODS

(1114) PROSPECION GEOTERMICA EN LOS CAMPOS PETROLIFEROS

(GEOTHERMAL INVESTIGATION IN OIL-BEARING FIELDS)

By D. Chahnazaroff

Petroleos y Minas, Buenos Aires, vol. 12, No. 132, 1932, pp. 6-8.

General information is given concerning temperature measurements of waters met in oil wells when accurate geophysical investigation is not possible for technical reasons.

This study of the thermal characteristics of underground waters during the time when the working of a well is temporarily interrupted may be of great aid to the oil geology of the region under investigation. (This question is discussed in detail by Chahanazaroff in his article "L' etude des eaux petroliferes" (study of petroliferous waters), published in Les Matieres Grosses, Paris, 1932, Nos. 289 and the following).--W. Ayvazoglou.

7. UNCLASSIFIED METHODS

(1115) GEOLOGISCH-LAGERSTÄTTENKUNDLICHE GESICHTSPUNKTE ZU DEN GEOELEKTRISCHEN UND ERDMAGNETISCHEN UNTERSUCHUNGEN

(GEOELECTRIC AND EARTHMAGNETIC INVESTIGATIONS FROM THE VIEWPOINTS OF GEOLOGY AND MINING INDUSTRY)

By R. Krahmann

Special reprint from the XI Bericht der Freiberger Geologischen
Gesellschaft, Freiberg, Saxony, 1931, pp. 3-19.

The author examines the procedure of the work and the principles of the electrical and magnetic methods of prospecting from the viewpoint of their practical application in mining industry and gives tables showing the electrical conductivities and magnetic susceptibilities of a series of most important rocks. Examples of practical application of the methods accompanied by a series of sketches and profiles are discussed.--V. Gorsky.

(1116) THE EFFECT OF GEOPHYSICS ON THE DEVELOPMENT HAZARD IN GULF COAST OIL FIELDS

By E. E. Rosaire and M. E. Stiles

Economic Geology, Lancaster, Pa., vol. 27, No. 6, 1932, pp. 523-532.

An index of hazard is proposed for the development of the Gulf Coast oil field in terms of the average number of exploratory wells chargeable to the producing domes in any class.

Indices of hazard are first calculated for the nongeophysically dis-overed Gulf Coast domes with more than nine development years. These ndices are found to be much greater than the corresponding indices of azard for the geophysically discovered domes. Of particular interest are he minimal indices of hazard for the very deep domes in both the geophysical nd nongeophysical classes:

It is concluded that the geophysically discovered domes show by far the ower indices of hazard, and that for the very deep domes remaining to be iscovered (by geophysics) the indices of hazard will be no greater than in ther petroliferous provinces now in grater favor.--Authors' abstract.

(1117) GEOPHYSICS (IN RUSSIAN)

Report of the Work of the Institutions of the Geological and Prospecting Service in the U.S.S.R., Moscow, 1930, pp. 130-142.

In the chapter "Geophysics," the last of the report, the work of the eophysical section of the Geological and Prospecting Service during the ears 1928 and 1929 is delineated. The application of the electrical, agnetic, gravimetric, and radioactive methods at various places of the .S.S.R. is described, and the results obtained are examined briefly. reparations for carrying out investigations by the seismic methods are entioned.--W. Ayvazoglou.

8. GEOLOGY

(1118) GRAPHISCHE DARSTELLUNG UND EINTEILUNG VON WASSERN AUS ERDÖLFELDERN

(GRAPHICAL REPRESENTATION AND DISTRIBUTION OF OIL-BEARING WATERS)

By D. Chahnazaroff

Internationale Zeitschrift für Bohrtechnik, Erdölbergbau und Geologie, Vienna, No. 8, April 15, 1932, pp. 55-56.

Various chemical compositions of oil-bearing waters of whole areas are ery rarely represented graphically; in most cases comparative diagrams of ingle waters are given only. The most convenient method of comparison of aters is that according to the four main characteristics: First and second egree of salinity and first and second degree of alkalescence. These nalyses are graphically constructed by using Bakhuis-Roozeboom's triangle or y Fedoroff's method; as both methods are inconvenient the author proposes is graphical method which is a modification of Bakhuis-Roozeboom's method. ny analysis of the water has its proper place on the plane, thus making the omparison and study of all the waters of a certain oil-bearing area very asy.--Author's abstract.

9. NEW BOOKS

1119) Jahrbuch der Deutschen Nationalen Komitees für die Internationalen Bohrkongresse (Yearbook of the German National Committee for the International Drilling Congress), vol. 2, 1932, 360 pp., 71 illus. Laubach and Everth, Berlin, S.W. 68, Alte Jacobstrasse 18-19.

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. No. 44. DEPARTMENT OF COMMERCE December, 1932.

UNITED STATED BUREAU OF MINES
Scott Turner, Director

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GEOPHYSICAL ABSTRACTS
MINING DIVISION

ABSTRACTS OF CURRENT ARTICLES ON GEOPHYSICAL PROSPECTING

Compiled by Frederick W. Lee

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1. GRAVITATIONAL METHODS

(1120) ON THE STRESSES IN THE EARTH'S CRUST REQUIRED TO SUPPORT SURFACE INEQUALITIES (SECOND PAPER)

By Harold Jeffreys

Monthly Notices of the Royal Astronomical Society, London, Geophysical Supplement, vol. 3, No. 2, 1932, pp. 60-69.

For the first paper see the same magazine, vol. 3, No. 1, 1932, pp. 30-41 (also Geophys. Abs. 39, p. 496). In this article the author continues the theoretical investigation of the stresses in the earth's crust required to support surface inequalities. The last part of this article deals with the discussion of stresses in a thin crust floating on a sphere.--W. Ayvazoglou.

(1121) DAS ABROLLENDE PHYSIKALISCHE PENDEL

(THE ROLLING-OFF PHYSICAL PENDULUM)

By Hans Gebelein

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 6/7, 1932, pp. 272-282.

The relation between the amplitude and time of oscillation of a pendulum as observed on precision clocks mounted on knife-edges, deviates from the law established by the theory for physical pendulums. This is due to the influence of the shape of the knife-edge upon the time of oscillation. With a knowledge of the relationships existing here it is possible to make conclusions on knife-edges of clock pendulums according to the running of the clock, to explain a series of inadequacies of knife-edge pendulums, and to obtain new ideas on the construction of such pendulums.--Author's abstract translated by W. Ayvazoglou.

(1122) AN UNRECOGNIZED PROPERTY OF THE REVERSIBLE PENDULUM

By Paul R. Heyl

Bureau of Standards Journal of Research, Washington, D. C., vol. 8, No. 5, 1932, pp. 657-658.

In a reversible pendulum which carries two planes and is supported from either plane in turn upon the same knife-edge, it is found that the correction for a circularly rounded knife-edge eliminates itself.--Author's abstract.

(1123) MESURE DE LA CONSTANTE DE GRAVITATION PAR LA BALANCE DE TORSION

(MEASUREMENT OF THE GRAVITATIONAL CONSTANT BY TORSION BALANCE)

By Josef Zahradníček

Publications; Faculté de Sciences de l'Université Masaryk, Czechoslovakia,
No. 153, 1932, 30 pp.

The measurements of the gravitational constant are carried out by the atic, dynamic, and the resonance methods; in the latter case this means forced oscillation which is performed by the secondary torsion balance the periodically changeable Newton field of force of the primary torsion lance. The torsion balances used are described and some of the prelimi- ry measurements and autograms of the excited and forced oscillations are ven and discussed. The method of registration of the oscillations is plained. According to the results of measurements obtained, the resonance thod is considered to be well suitable for measuring the gravitational nstant, owing to the simplicity and clearness of this method.--Author's stract translated by W. Ayvazoglou.

(1124) PRATT AND AIRY AND ISOSTASY

By Alfred C. Lane

Science, New York, vol. 76, No. 1959, 1932, pp. 53-54.

Pratt and Airy's viewpoints, based on the principles of their repre- ntation, are discussed briefly and their arguments are compared with the esent-time conceptions.--W. Ayvazoglou.

(1125) A GRAVITATIONAL SURVEY OVER A REGION OF MAGNETIC ANOMALY AT THRUSSINGTON, LEICESTERSHIRE

By W. F. P. McClintock and J. Phemister

Summary of Progress, Geological Survey of Great Britain for 1930,
part 2, pp. 74-90, 6 figs.

1. The site of magnetic anomaly corresponds with the site of a local avity anomaly subsidiary to a larger gravity anomaly.

2. The main gravity anomaly corresponds with the rise of Palaeozoic or chaean rock beneath the unconformity at the base of the Keuper Marl.

3. The surface of unconformity reaches most closely to the surface near e farmhouse of Carthagena where it may be at a depth of the order of 100 et.

4. From its highest point beneath Carthagena the surface of unconformity probably falls to northeast and southwest with a slope of at least 1 in 20. To the southeast the fall is more rapid, probably about 1 in 5 or 6.

5. A local ridge in the old rock is located east of Longlands farm and strikes northeast to southwest. The depth to the top is of the order of 200 feet if the rock is formed of strata of early Palaeozoic or Archaean age, but probably is 300 to 400 feet if of Carboniferous sediment.

6. The highest point of the ridge mentioned in the preceding paragraph is near the center of the magnetic anomaly. The strike of the ridge is inclined at 20° to the axis of the magnetic anomaly.

7. It is suggested that the results of the gravitational survey do not exclude the hypothesis of sills and dykes in Palaeozoic sediments as the origin of the magnetic anomaly.

8. Variation of gradient over the mapped position of the Sileby fault was clearly detected but it was not of the order to be expected if a vertical displacement occurs in the surface of unconformity.--Author's abstract.

(1126) NEW GEOPHYSICAL INSTRUMENT

Editorial note

Canadian Mining Journal, Gardenvale, vol. 53, No. 11, 1932, pp. 520-521.

A brief description of the Askania integrometer, constructed by the American Askania Corporation, is given. The purpose of the instrument is accurately and quickly to determine gradients of gravity and other gravity data by simple integration of a cross section through an interesting area. The apparatus is particularly applicable for torsion balance and pendulum work.--W. Ayvazoglou.

2. MAGNETIC METHODS

(1127) GESTEINSMAGNETISMUS UND SÄKULARVARIATION

(MAGNETISM OF ROCKS AND SECULAR VARIATION)

By J. Koenigsberger

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 6/7, 1932, pp. 322-324.

The residual magnetization of younger eruptive rocks surpasses the induced magnetization usually from 3 to 8 times at 20° C. and remains greater also in case of increase of temperature (that is, at greater depths) up to about 470° C. because the decrease of magnetization of both kinds with the temperature is similar.

Secular variation shows other changes in local anomalies when the sidual magnetization surpasses the induced magnetization than those that cur when the induced magnetization surpasses the residual one. This fact y serve as an aid in determining the residual value and the direction of e eruptives at depths down to 50 kilometers.--Author's abstract trans- ted by W. Ayvazoglou.

(1128) ON A PRELIMINARY MAGNETIC SURVEY OVER THE PENTLAND FAULT, NEAR PORTOBELLO, MIDLOTHIAN, SCOTLAND

By A. F. Hallimond

Summary of Progress, Geological Survey of Great Britain for 1930,
part 3, pp. 30-38, 3 figs.

A limited area of high magnetization which agreed with the location the fault shown in the geological map was established.--W. Ayvazoglou.

(1129) ON A MAGNETIC SURVEY OVER THE LORNTY DYKE, BLAIRGOWRIE, PERTHSHIRE

By W. F. P. McClintock and J. Phemister

Summary of Progress, Geological Survey of Great Britain for 1930,
part 3, pp. 24-29, 2 figs.

The supposed direction of the Lornty-Tholeiit vein is well shown by ree magnetic profiles.--W. Ayvazoglou.

(1130) THE UNSYMMETRICAL DISTRIBUTION OF MAGNETIC SECULAR VARIATION

By Harlan W. Fisk

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 37, No. 3, September, 1932, pp. 235-240.

To show the complexity of the secular-variation system, Fisk refers to e series of isoporic charts (charts showing lines of equal annual changes) the elements recently prepared by the author as a preliminary picture of e distribution of secular variation (H. W. Fisk, "Regional distribution magnetic secular variation over the earth's surface," Trans. Am. Geophys. ion, 11th annual meeting, 1930, pp. 215-223). In this article the dis- ibution of isoporic foci of greatest annual change of the magnetic ele- its is shown in a map. Areas in the northern hemisphere having increasing rizontal intensity are given in another map.

Three diagrams show: (1) The longitudinal distribution of proportion annual change ($\Delta H/H$) of horizontal intensity; (2) latitudinal distribu- on of proportion of annual change ($\Delta H/H$) of horizontal intensity, and

(3) variation with longitude of $\triangle H/H$ (annual change averaged without regard to sign) of the distribution of the proportion of land and water areas, and of secular-change activity approximately determined by the density of the distribution of isoporic lines.--W. Ayvazoglou.

(1131) DISTRIBUTION OF MAGNETIC OBSERVATORIES AND SECULAR-VARIATION STATIONS

By J. A. Fleming

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 37, No. 3, 1932, pp. 245-252.

In the collection of data through the magnetic survey of the earth, paramount attention must be given to the geographical and space distributions and to the time variability characterizing the phenomena concerned. Valuable information already existing regarding the magnetic and electric conditions of the earth must be supplemented by better distribution of continuous registrations, as well as secular-variations at field stations.

In two figures the author gives the locations of existing magnetic observatories, repeat stations, and desirable additional repeat stations in the eastern and western hemispheres.--W. Ayvazoglou.

(1132) CHAPTERS IN THE HISTORY OF TERRESTRIAL MAGNETISM

By A. Crichton Mitchell

Terrestrial Magnetism and Atmospheric Electricity, Baltimore,
vol. 37, No. 2, 1932, pp. 105-146.

A detailed history of the development of the science of terrestrial magnetism is presented. The method adopted is that of collating the various accounts which have been given of the discovery of its fundamental principles and their gradual evolution into the form in which they are at present held. Ample bibliographical references are provided.--W. Ayvazoglou.

(1133) PRELIMINARY NOTE ON A NEW MAGNETOMETER

By C. A. Heiland

Physics, Menasha, Wis., vol. 3, July, 1932, pp. 18-22.

A vertical magnetometer is described which is believed to fill the need for an intermediate type between the dip needle and the Schmidt balance. It does not require a tripod and levels itself. The compass for orienting remains attached to the instrument. The instrument may also be compensated readily for temperature. The magnetometer utilizes a magnetic system suspended in jewels in or near its center of gravity. The magnetic vertical intensity is balanced by the torsion of a helical spring. The magnetic system is adjusted to the normal vertical intensity in the area under survey by a suitable setting of the spring, and the anomaly is roughly proportional to the angle of deflection from the horizontal.--Author's abstract.

(1134) DISCUSSION SUR CERTAINES CAUSES D'ERREURS DANS LA BALANCE VERTICALE DE SCHMIDT

(DISCUSSION ON CERTAIN CAUSES OF ERRORS IN THE SCHMIDT VERTICAL BALANCE)

By Th. Koulomzine

Annales de l'office national des combustibles liquides, Paris,
vol. 7, No. 4, 1932, pp. 775-791.

According to the discussion of the causes of errors the author draws the conclusion that the errors of E-W orientations, of leveling, etc., compensate each other by rotations about 180°, but the apparatus must be solidary with the axis of rotation about 180°. The author proposes to make two axes: One for the E-W orientation of the instrument by means of a compass, and another solidary with the apparatus for the rotation about 180°. He also devised a new support of the instrument and new improved magnetic system in order to reduce to the minimum the variableness of the temperature coefficient.--B. and V. Perebaskine.

3. SEISMIC METHODS

(1135) EIN BEITRAG ZUR THEORIE DER REFLEXION UND BRECHUNG ELASTISCHER WELLEN AN UNSTÄTIGKEITSFLÄCHEN

(CONTRIBUTION TO THE THEORY OF REFLECTION AND REFRACTION OF ELASTIC WAVES FROM LAYERS OF DISCONTINUITY)

By Heinr. Blut

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 6/7, 1932, pp. 305-322.

This is a continuation of the article published by the author in "Zeitschrift für Geophysik," vol. 8, No. 3/4, 1932, p. 130 (see Geophys. Abs. 40). Translation of the author's abstract reads as follows:

> The author calculates the ratio of the displacement of a direct and reflected longitudinal wave for a limiting surface of a stratified medium. Calculations of the horizontal component and the vertical component are carried out separately. A pure longitudinal reflection and an alternating wave (longitudinal-transversal) is assumed as a reflected wave. The formulas are calculated numerically and represented graphically for the parallel as well as the mutually inclined limiting surfaces. A maximum of the ratio of dislocation occurs in all cases, although at different places, depending on the kind of inclination.--W. Ayvazoglou.

(1136) THE EFFECT OF GEOLOGICAL STRUCTURE UPON MICROSEISMIC DISTURBANCE

By A. W. Lee

Monthly Notices of the Royal Astronomical Society, London, Geophysical Supplement, vol. 3, No. 2, 1932, pp. 83-105.

The suggestion that the amplitude of microseismic disturbance depends upon the geological structure leads to investigations of the effects of the underlying formations upon the stability of a seismograph pillar and upon the propagation of Rayleigh waves through the granitic continental layer.

Analysis of the motion of a seismograph pillar, and measurements of the earth resistance at Durham and Kew, show that the tilting of the pillars due to microseismic oscillations is negligible; consequently the accuracy with which these oscillations are recorded can not depend upon the subsoil.

Love's theory of propagation of waves analogous to Rayleigh waves in a medium covered with a superficial layer is extended for compressible material, and applied for layers of limestone, sandstone, and clay upon granite. The ratio of horizontal to vertical movements at the surface depends upon the material and thickness of the layer. Assuming the same total energy per wave-length, the surface movements with the layers are larger than those with Rayleigh waves in granite; the effect of layers up to 1 km in thickness upon the horizontal amplitude is greater than that upon the vertical amplitude

Taking the horizontal amplitude of the microseisms as the larger of the north and east components, the ratio of horizontal to vertical motion is obtained for a number of European observatories; at stations on the earlier geological formations the ratio agrees with the theoretical value for Rayleigh waves. The variations from place to place in microseismic amplitude are apparently due to geographical as well as geological causes.--Author's abstract.

(1137) MICROSEISMIC DISTURBANCE IN GREAT BRITAIN DURING 1930 JANUARY: A COMPARISON OF THE RECORDS OF SEVEN OBSERVATORIES

By A. W. Lee

Monthly Notices of the Royal Astronomical Society, London, Geophysical Supplement, vol. 3, No. 2, 1932, pp. 105-116.

The seismograms of seven observatories in Great Britain for January, 1930, have been examined, and in each case the amplitude and period of the microseisms were determined for four hours daily.

There is a large variation between the mean amplitudes at the different stations, the values ranging from 5.4 μ at Edinburgh to 2.3 μ at Kew. The mean periods vary from 6.1 sec. at Durham to 6.8 sec. at Kew; the modes are generally slightly less than the means.

At each station, in the average, the amplitude increases as the period
engthens. The correlation between the amplitudes at different stations is
bout 0.8, and that between the periods about 0.6.--Author's abstract.

(1138) ON THE MECHANISM AND THE TYPES OF THE SEISMOGRAMS OF SHALLOW EARTHQUAKES

By H. Honda

The Geophysical Magazine, Tokyo, vol. 5, No. 1, 1932, pp. 69-88.

The main results of the present investigation, which is a continuation
f the former research of the author on a similar problem (Geophys. Mag.,
ol. 4, No. 3), are summarized as follows:

1. The relations between the initial motion recorded by the seismographs
nd the mechanism at the origin of shallow earthquakes, such as the North Idu
nd the North Tango earthquakes, were investigated.

2. Some explanations on the mechanism of aftershocks and swarms of
arthquakes were proposed, after investigating the aftershocks of the West
aitama earthquake and the swarms of earthquakes in Itō.

3. The relations between the types of the seismograms and the mechanism
f shallow earthquakes were investigated, basing the study mainly on observa-
ions of the aftershocks of the Western Saitama earthquake. It was shown
hat the relations obtained from the actual observation are in good coinci-
ence with the results of the theoretical considerations, not only qualita-
ively but also quantitatively; and these relations were shown diagrammatical-
y.--Author's abstract.

(1139) SURFACE (RAYLEIGH AND LOVE) WAVES IN A TWO-LAYER CRUST

By H. Arakawa

The Geophysical Magazine, Tokyo, vol. 5, No. 2, 1932, pp. 123-139.

As, according to the author, the problem of the surface waves in a two-
ayer crust has been treated by many authors by studying the Rayleigh and
ove waves separately, Arakawa gives in this article a mathematical dis-
ussion of the Rayleigh and Love waves at the same time, using the method
eveloped by H. Nakano which makes possible the generalizations with respect
the Rayleigh and Love waves.--W. Ayvazoglou.

(1140) EIN QUECKSILBERNEIGUNGSMESSER VON HOHER EMPFINDLICHKEIT

(A QUICKSILVER INCLINOMETER OF HIGH SENSITIVITY

By H. Haalck

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 6/7, 1932, pp. 256-271.

After describing the theory of the highly sensitive quicksilver inclinometer and possible ways of using it in practice, the results of measurements carried out with three test models are given, and the conclusions drawn from these tests are discussed. It is shown that measurements by a small model 33 cm long have an accuracy equal to about ± 1/4 second; a larger model 60 cm long gives an accuracy equal to ± 1/12 second. Owing to the fact that the sensitivity of the quicksilver inclinometer can be increased with increase in size without augmenting any faulty tendencies, an accuracy equal to ± 0.0001 second can be obtained with an instrument 20 meters; this will make it possible to measure the ebb and flow movements of the earth's body. It is besides possible to develop the inclinometer into a leveling instrument by which altitude differences can be measured with an accuracy equal to at least 1 μ.--Author's abstract translated by W. Ayvazoglou.

4. ELECTRICAL METHODS

(1141) EIN NEUER WEG DER KARSTHYDROLOGISCHEN FORSCHUNG DURCH ANWENDUNG GEOELEKTRISCHER METHODEN

(A NEW METHOD FOR INVESTIGATING THE CARSO (KARST) HYDROLOGICAL REGION BY USING GEOELECTRICAL METHODS)

By Alfred Löhnberg and Walter Stern

Zeitschrift für Geophysik, Braunschweig, vol. 8, No. 6/7, 1932, pp. 283-305.

Based on the representation of the hydrographic phenomena in the Carso on the surface of the ground as well as below it and also on the theories concerning these phenomena, which, of course, are partly conflicting, the authors prove the inconsistency of the existing methods of investigating the Carso region. The geoelectrical "method of the apparent specific resistance", which has been successfully applied in various other cases is described by the authors as the new method for determining the principles of the hydrological problems, especially those of the Poljen (Poljen are large closed basins in the Carso, having the character of valleys).

The first results of investigation carried out in Zirknitz-Polje (Krain, Jugoslavia) are communicated and the subterranean hydrographic direction of the Poljen, as well as the mechanism of the inundation of the Poljen, are examined briefly. A detailed classification of hydrographic and structural conditions in the Zirknitz Basin, as determined by the results of investigation, will appear in one of the later geographic publications issued by the mathematic-physical faculty of Göttingen.--Authors' abstract translated by W. Ayvazoglou.

(1142) DER EINFLUSS DER ERDBODENEIGENSCHAFTEN AUF DIE AUSBREITUNG ELEKTROMAGNETISCHER WELLEN

(THE INFLUENCE OF THE PROPERTIES OF THE GROUND ON THE SPREADING OF ELECTROMAGNETIC WAVES)

By M. J. O. Strutt

Hochfrequenztechnik und Elektroakustik, Leipzig, vol. 39, No. 5, 1932,
pp. 177-185.

Contents of the article:

I. Emission of electromagnetic waves without taking into consideration he ground (in free space): (1) Electrical elements of radiation; (2) elec-rical images of radiation; (3) magnetic elements of radiation and images of adiation; (4) measurement of radiation.

II. Radiation diagram under the influence of the ground: (1) Vertical lectric dipole; (2) vertical magnetic dipole; (3) horizontal electric ipole; (4) vertical electric dipole; (5) wires and coils of limited length; 6) diagrams of radiation images; (7) radiation impedance and radiation re-istance; (8) measurements of radiation diagrams.

III. Field strength on the ground: (1) vertical electric dipole; (2) ertical magnetic dipole; (3) horizontal electric dipole; (4) horizontal agnetic dipole; (5) radiation images; (6) measurements of field strength.

IV. Experimental determinations of the properties of the ground: (1) etermination of the field strength measurements; (2) determination of the easurement of inductivity of serial lines; (3) determination according to . Abraham and H. Rausch von Traubenberg; (4) determination on samples of he soil in a measuring condenser.

A mathematical discussion of electromagnetic radiation problems is iven. Radiation fields of simple electric and magnetic dipoles in free pace are derived. In the second part the radiation diagrams taking into onsideration the existence of the ground are examined. Methods for measur-ng radiation diagrams are described.--W. Ayvazoglou.

'1143) ÜBER DEN ELEKTRISCHEN NACHWEIS VON ERDÖL

(ON THE ELECTRICAL METHOD OF PROSPECTING FOR OIL)

By Heinrich Löwy

Kali, Berlin, vol. 26, No. 14, 1932, pp. 174-175.

In development of his previous investigations described in "Die Natur-issenschaften," 1927, p. 921 (see Geophys. Abs. 12, p. 16), and "Physikalische

Zeitschrift," 1931, p. 337 (Geophys. Abs. 34, p. 366), the author mentions in this article his investigations carried out recently in Southern Harz Mountains (Südharz) in the potash region of Hannover.

The experiments were started with an antenna (oscillator) 50 meters long; this length was increased to 750 meters. The small value of the resistance (39 ohms) measured at the longest antenna allows the author to express the hope that greater depths can be reached by using still longer antennas.

Löwy concludes that the fitness of the method must be considered to be proved here also, but that further tests in mines, where the results of measurements can be confirmed directly by boring, are required.--W. Ayvazoglou.

(1144) THE MAGNETIC FIELD INTENSITY NEAR A CIRCULAR LOOP CARRYING AN ELECTRIC CURRENT

By A. L. Fitch

Journal of the Franklin Institute, Lancaster, Pa., vol. 214, No. 2, 1932, pp. 215-221.

A general mathematical formula is derived in this article by the author for the magnetic field intensity at any point near the loop. These calculations were made in development of the formulas of the magnetic field intensity in the plane of the loop and inside the loop worked out by Strom (Journal of the Franklin Institute, 1928, p. 339).

According to the author, his equations are now being tested experimentally and check very well as far as the tests have gone.--W. Ayvazoglou.

(1145) ÉTUDE DES COURANTS VAGABONDS ET DES PHÉNOMÈNES D'ÉLECTROLYSE

(STUDY OF STRAY CURRENTS AND OF THE PHENOMENA OF ELECTROLYSIS)

By C. and M. Schlumberger

Annales des Postes, Télégraphes et Téléphones, Paris, September, 1932. 19 pp.

This paper deals with the study of the direction and intensity of stray currents. By means of a registering apparatus, the two perpendicular components of the currents flowing in the ground are automatically recorded on diagrams, so that it becomes possible to determine the intensity and direction of the current at a given station for a long time.

For the corrosion of pipe lines, the use of a differential apparatus constituted by three electrodes makes it possible to determine the places where there is a flow of current from the pipe line into the ground, or vice versa. The apparatus employed is described in detail.--E. G. Leonardon.

(1146) APPLICATION DE LA PROSPECTION ÉLECTRIQUE AUX RECHERCHES DE PÉTROLE EN U.S.S.R.

(APPLICATION OF ELECTRICAL METHOD OF PROSPECTING FOR OIL IN THE U.S.S.R.

By C. and M. Schlumberger and P. Charrin

Science et Industrie, Numero hors série "La technique des Industries du Pétrole," 1932, 10 pp.

This paper discusses a whole series of problems solved by surface exploration and electrical coring methods in the oil fields of U.S.S.R. Among the examples particularly interesting may be cited the following:

1. Electrical coring on the Grozny anticline.
2. Electrical determination of the prolongation of the Bibi-Eybat anticline in the Caspian Sea.
3. Location of a series of faults in the Sourakhany oil field by means of electrical coring.--E. G. Leonardon.

(1147) THE SIGNIFICANCE AND ACCURACY OF MEASUREMENTS OF EARTH-CURRENT POTENTIALS

By W. J. Rooney

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 37, No. 3, 1932, pp. 235-240.

The superficial simplicity of measurements of earth-current potentials makes them liable to error due to inadequate appreciation of the requirements for securing satisfactory records and has led to faulty interpretation of the results obtained. Records from the multiple systems at Watheroo and Huancayo demonstrate the lack of significance of the absolute values of potential recorded and of the long-period changes in them, most of which are due to meteorological conditions. The value of independent records as a check on the satisfactory operation of the recording equipment and as an indication of anomalous results due to local structural inhomogeneity is shown by examples taken from the records from these two observatories. Duplicate potential records and earth-resistivity data both are essential for adequate study of the phenomenon.--Author's abstract.

(1148) LES PHÉNOMÈNES ÉLECTROMAGNETIQUES PRODUITS SUR LA TERRE PAR L'EMISSION ÉLECTRONIQUE DU SOLEIL

(ELECTROMAGNETIC PHENOMENA PRODUCED ON THE EARTH BY THE ELECTRONIC EMISSIONS OF THE SUN)

By A. Douvillier

Revue générale de l'Électricité, March 5, April 2 and April 9, 1932.

The electrons emitted by the sun describe on the arrival at the surface of the earth, geodesic tubes of forces of the magnetic field and then disappear without leaving charges. Secondary electrons create the polar lights.

The author proves the existence of a general aurora which is more important than the polar aurora. One-half of the secondary electrons escape and the conducting layer in the upper atmosphere receives a positive charge by which the vertical atmospheric current is explained.

The polar geodesics represent demagnetizing fields which turn about the globe and cause the diurnal variation of the terrestrial magnetism. The diurnal telluric variation is explained by the influence of one part of the positive equatorial afflux, due to solar ultraviolet rays, by which the electrostatic induction is produced. The magnetic disturbances are produced by the demagnetizing effect of primary and secondary auroral paths.

The author concludes that the zodiacal light seems to be the source of the terrestrial magnetism and that the origin of cosmic rays consists of Rontgen rays produced by the solar electrons in the upper atmosphere.--B. and V. Perebaskine.

5. RADIOACTIVE METHODS

(1149) EINE EINFACHE ZÄHLVORRICHTUNG FÜR DIE IMPULSE EINES GEIGER-MÜLLERSCHEN ZÄHLROHRES

(A SIMPLE COUNTING ARRANGEMENT FOR THE IMPULSES OF A GEIGER-MÜLLER COUNTER TUBE)

By R. Jaeger and J. Kluge

Zeitschrift für Instrumentenkende, Berlin, vol. 52, No. 5, 1932, pp. 229-232.

A description of the arrangement accompanied by a schematical design is given.--W. Ayvazoglou.

(1150) PRELIMINARY NOTE ON AN AUTOMATIC RECORDER GIVING A CONTINUOUS HEIGHT RECORD OF THE KENNELLY-HEAVISIDE LAYER

By T. R. Gilliland and G. W. Kenrick

Bureau of Standards Journal of Research, Washington, vol. 7, No. 5,
1931, pp. 783-789.

This paper describes a preliminary installation of a continuous auto-
ic recorder of virtual height of the Kennelly-Heaviside layer. This
tallation requires that a chopper at the transmitter and a revolving
ror at the receiving station be driven by synchronous motors connected
the same power system. The group retardation method of Breit and Tuve
used with a few modifications which permit continuous record to be
le. Suggestions are made for improvements which might be incorporated
a permanent installation.--Authors' abstract.

.51) KENNELLY-HEAVISIDE LAYER STUDIES EMPLOYING A RAPID METHOD OF VIRTUAL-HEIGHT DETERMINATION

By J. P. Schafer and W. M. Goodall

Proceeding of the Institute of Radio Engineering, vol. 20, July, 1932,
pp. 1131-1148.

This paper describes a new method of determining the virtual height
the ionized regions by visual observations of the received pulse pattern
a cathode-ray oscillograph tube, both for single frequencies and for two
equencies simultaneously. A résumé of the data obtained during observa-
ons of some three hundred hours is given. The frequencies used for these
ts were 1604 kc, 2398 kc, 3256 kc, 4795 kc, and 6425 kc. A number of
tests included measurements made upon two frequencies in rapid rotation.
more important results may be summarized as follows: (1) On a large
ber of occasions during the night, a phenomenon has been observed
arently indicating an increase in the density of ionization in the
er layer. This is important because the ionization is usually assumed
decrease during the night hours. (2) Reflections are often observed
ultaneously from both ionized layers. An explanation of this phenomenon
given. (3) The virtual heights of the reflecting layers are rarely
licated from day to day for a given time and frequency. (4) Large
bers of multiple reflections are frequently obtained representing a
h distance of over 5,000 km for the last reflection. This fact indicates
t the multiple-hop mode of propagation is probable for long-distance
nsmission.--Author's abstract.

6. GEOTHERMAL METHODS

(1152) THE DEFORMATION OF THE EARTH DUE TO UNSYMMETRICAL COOLING

By Harold Jeffreys

Monthly Notices of the Royal Astronomical Society, London, Geophysical Supplement, vol. 3, No. 2, 1932, pp. 53-59.

The elastic distortion of the earth due to unsymmetrical cooling is estimated. A mathematical discussion is given. The article is concluded by some observations on the influence of differential cooling which seems to offer some prospect of an explanation of vertical movements of the surface, such as are needed to explain the foundering of parts of continents, the deepening of oceans, and the formation of land bridges and geosynclines.--W. Ayvazoglou.

(1153) EARTH DISTORTION

By J. S. DeLury

Canadian Mining Journal, Gardenvale, vol. 53, No. 10, 1932, pp. 444-447.

This is the third of a series on the autotraction hypotheses of crustal evolution published by DeLury and appearing in the Canadian Mining Journal: 1. Movements of the earth's crust, vol. 53, No. 4, 1932, pp. 161-165 (see Geophys. Abs. 38, p. 484); 2. Flow in solids: Ice, Rock Salt and Rock, vol. 53, No. 6, 1932, pp. 257-261. The second contribution dealt more particularly with the mechanism of sheet flow and autotraction and an attempt was made to show that the mechanism of ice sheets is exhibited also by beds of rock salt and by rocks themselves.

In applying the mechanism to the earth, a logical sequence of phenomena is indicated, and in this (third) paper, after the sequence is outlined, the first link in the chain, namely earth distortion, is discussed under the following headings:

Outline of autotraction hypothesis (1. Evidence of distortion; 2. isostasy; 3. gravity adjustment through sheet flow; 4. autotraction; 5. deformation of the crust).

Forces available for distortion (thermal distortion).

Three figures illustrate the article.--W. Ayvazoglou.

(1154) GEOTHERMISCHE MESSUNGEN IN DEN BOHRLÖCHERN DES DONETZBECKENS

(GEOTHERMAL MEASUREMENTS IN THE BOREHOLES OF THE DONETZ BASIN)

By S. Kraskowski

Gerlands Beiträge zur Geophysik, Ergänzungshefte der angewandten
Geophysik, Leipzig, vol. 3, No. 1, 1932, pp. 9-28.

In the autumn of 1931 the Central Scientific Institution of Geology d Geophysical Prospection in Leningrad carried out an experimental thermo- rvey in the deep drill holes of the Stalin district in the Donetz Basin.

The apparatus used by the Geothermical section of the institution was nstructed by members themselves and consisted of a winch with steel-wire d tripod, steel thermometer tubes, and a set of maximum thermometers. e distribution of the temperature was investigated in five drill holes. o of these holes belonged to the region of the future "shaft 100," where ning shall take place at a depth of 1,200 meters (4,000 feet); thus it s very important to determine the temperature in advance. The influence the water in the hole on the normal distribution of the temperature was termined by preliminary observations in two drill holes: The gradient temperature did not exceed 0.39° C. in the first hole and 0.26° C. in e second hole. The temperature curves deviated very little from a raight line; these anomalies could be explained by the influence of water yers, thermal conductivity, convection currents, etc.

The importance of the analysis of the temperature curve in geothermic vestigations is very great; therefore it is imperatuve to determine the ermal-conductivity of the rock samples in addition to the thermometrical servations.--Author's abstract.

7. UNCLASSIFIED METHODS

(1155) SOME ASPECTS OF APPLIED GEOPHYSICS

By A. O. Rankine

Nature, London, vol. 130, No. 3281, 1932, pp. 421-424.

The four principal methods of geophysical investigation--gravitational, gnetic, seismic, and electrical--are discussed.

The gravitational method. - Rankine expresses the opinion that there convincing proof that extensive underground features, such as salt domes, mestone anticlines and synclines, rock faults, and deposits of hematite of brown coal, produce, if not too deeply buried or masked by complicat- g irregularities, gravitational disturbances large enough to lead to eir delineation.

The seismic method. - For success the principal requirement is a large velocity-ratio as between the rocks constituting the various beds. Salt domes under alluvial deposits are in this respect suitable structures. Valuable results are also obtained in determining the underground contours of limestone anticlines and deep-seated granitic basements at depths of several thousand feet.

The magnetic method. - Simplest and least costly is the magnetic method. The chief difficulty with the variometers at present available is the application of the corrections for diurnal variation of the earth's field and for temperature changes. Rankine says that if the necessity of applying the corrections which these effects involve could be escaped we should feel much safer in attaching significance to anomalies only a few times larger than the limit of measurement of the apparatus. The author expresses the hope that a magnetic instrument can be constructed to operate in the same way as the proved gravity instrument. A brief outline of what a device of this kind might be expected to achieve is indicated.

Electrical methods. - Concerning electrical methods the author directs the reader to the report of the Imperial Geophysical Experimental Survey (The principles and practice of geophysical prospecting) which operated in Australia from 1928 until 1930 (see Geophys. Abs. 30, p. 257), as he considers this report the most comprehensive and authoritative treatment available of the subject of electrical surveying.--W. Ayvazoglou.

(1156) A DEMONSTRATION OF THE GEOLOGIC POSSIBILITIES OF THE RESISTIVITY AND MAGNETIC PROSPECTING METHODS

By C. A. Heiland

Terrestrial Magnetism and Atmospheric Electricity, Baltimore, vol. 37,
No. 3, (Bauer Memorial Number) September, 1932, pp. 343-350.

The purpose of the article is to describe a number of the more recent geological applications of the magnetic and electrical resistivity methods.

Results of some recent magnetic observations are described which demonstrate that gold can not only be located in placers when associated with magnetite, but also in situ if it occurs in magnetite-bearing contact-metamorphic rocks.

The usefulness of the magnetometer in reconnaissance mapping of oil structures associated with uplifts of the crystalline basement rocks has been demonstrated in numerous oil fields throughout the United States. An example is given showing the agreement between magnetic and structural contours.

Resistivity methods are used successfully in engineering geology to outline zones of weakness and to determine depths to bedrock under cover. A number of results obtained in this work are demonstrated.

Finally, progress has been made in the application of resistivity
thods to the location of groundwater. A number of typical curves and
eir interpretation are discussed.--Author's abstract.

(1157) INTERESTING WORK ON PROSPECTING

Editorial note

Canadian Mining Journal, Gardenvale, vol. 53, No. 9, 1932, p. 420.

This note mentions the work, "Prospecting and exploration," by R. C.
tson, Michigan College of Mining and Technology, Houghton, Mich. A large
rt of the book is dedicated to geophysical methods of prospecting.--W.
vazoglou.

(1158) ENGINEERING USES FOR GEOPHYSICS
SOUNDING THE EARTH BY SEISMIC, MAGNETIC, AND ELECTRICAL METHODS

By Sherwin F. Kelly

Civil Engineering, vol. 2, No. 10, 1932, pp. 628-632.

A brief explanation of principles of seismic, magnetic, and electrical
thods, as well as a few examples of their application, is given to show
vil engineers that geophysics can be of real service to them in many of
eir problems. The article is illustrated by photographs and diagrams.--W.
vazoglou.

(1159) MODERN PROSPECTING METHODS IN RHODESIA

Editorial note

The Rhodesian Mining Journal, Johannesburg, vol. 6, No. 64, 1932,
pp. 457-458.

Successful results of the electrical and magnetic methods of prospect-
g for determining the presence of mineral deposits in Northern Rhodesia
e mentioned and the application of these methods in Southern Rhodesia
commended.--W. Ayvazoglou.

(1160) CONSTRUCCION DE MAPAS GEOFISICAS

(PREPARATION OF GEOPHYSICAL MAPS)

By D. Chahnazaroff

Petroleos y Minas, Buenos Aires, vol. 12, No. 135, 1932, pp. 6-8.

The author emphasizes that all the geophysical and geological institutes,
ning departments and other establishments that are in possession of geologi-
l collections from various regions must study the physical properties of

all samples available and draw these properties, in the form of conventional signs, on geological maps existing already. In this way geophysical (geodensimetric, geomagnetometric, etc.) maps could be prepared. These maps will be of great use to the geophysicist in his exploration work, similar to the usefulness of geological maps to the geologist.

The author accomplished such a work for a region in Bosnia and Herzegovina; part of the results of his work was published in a special book, "Les travaux de laboratoire géophysique" (Transactions of the geophysical laboratory), part 1, 1932.--Author's abstract.

(1161) GEOPHYSIKALISCHES PROSPEKTIEREN AUF ERDÖL IN DEN U.S.A. IM JAHRE 1930

(GEOPHYSICAL PROSPECTING FOR OIL IN THE U.S. IN 1930)

By R. Schreiter

International Erdöl-Union, Vienna, August 15, 1931.

Geophysical prospecting for oil and salt domes carried out in the United States, based on data in American and Swedish publications, is discussed.--W. Ayvazoglou.

(1162) ZUR GEOPHYSIKALISCHEN DURCHFORSCHUNG BAYERNS

(CONCERNING GEOPHYSICAL EXPLORATION OF BAVARIA)

By A. Wurm

Geologische Rundschau, Berlin, No. 12, 1931, pp. 273-281.

Geophysical surveys carried out in Bavaria are briefly examined from the geological viewpoint for the first time. Although the net of exploration is very wide, certain relationships with the geological substructure can be established. A series of anomalies can still not be interpreted. Close cooperation of geophysics with geology, increase and improvement of pendulum and magnetic measurements, supplementing them with seismic methods, will certainly give important scientific and practical results.--F. Trusheim's abstract (Geologisches Zentralblatt, p. 424) translated by W. Ayvazoglou.

(1163) LA PHYSIQUE DU GLOBE DANS LES COLONIES FRANÇAISES

(PHYSICS OF THE EARTH IN THE FRENCH COLONIES)

By H. Hubert

Revue Scientifique, 1931, No. 21, pp. 645-647.

The author writes on the organization of the scientific work in the French colonies.

1. Reorganization of the meteorological network: Twenty-seven main sta- ons, 124 stations of the first order, and 532 stations of the second order provided for in the governments of Indo-China, French Occidental Africa, ench Equatorial Africa, and in Madagascar.

2. Seismology: The following stations were working already in 1931: kar (Senegal), Lome (Togo), Tananarive (Madagascar), Fort-de-France (Martin- ue), Phu-Lien (Indo-China), Papeete (Oceania) and Noumea (New Caledonia).

3. Torrestrial magnetism: The establishment of the following stations decided: Dakar, Phu-Lien and Morne-des Cadets (Martinique).

4. Physical oceanography: In addition to the mareografs of the ordinary pe, two instruments for registering the surge will be placed in Togo and rtinique.

5. Volcanology: Active volcanoes in the French colonies are: That of e Mount Pelee (Martinique), of the Great Comoro (Reunion), and on the bry Island (New Hebrides). The volcanological observatory in Martinique ll begin to operate in the course of 1931 and will undoubtedly be the most portant one in the world as far as its dotation of information and its vestigations are concerned (variations of telluric currents, terrestrial gnetism, mechanical vibrations, thermal variations, thermal and chemical lifications, fumaroles, etc.).

6. Scientific hydrology is represented by various offices (Public Works, ology, Irrigation, Hydraulic forces, etc.).

7. Geophysical prospecting: The services of the physics of the earth ll be able to furnish information necessary for the determination of abso- te values either for the control or for the examination.--B. and V. rebaskine.

8. GEOLOGY

(1164) CONTRIBUCION AL ESTUDIO DEL MEDIO DE LOS HIDROCARBUROS

(CONTRIBUTION TO THE STUDY OF CONDITIONS ACCOMPANYING THE FORMATION OF HYDROCARBONS

By D. Chahnazaroff

Petroleos y Minas, Buenos Aires, vol. 12, No. 137, 1932, pp. 8-10.

In this article the author gives a description of astrophysical and the terior thermodynamic and chemical conditions of those envelopes of the rth crust in which the elements, the combination of which produces oil de- its, may have been concentrated. A correct knowledge of these conditions important not only for the solution of the question concerning the origin oil, but also for the purpose of practical geology and mining; this second question is especially emphasized by the author and conditions, so far not sufficiently elucidated, under which the movement of liquid bodies, in particular of oil-bearing waters, may occur are discussed in detail. Special investigations, which form a part of the large work called "geophysics," allow us to draw conclusions important for the economic geology of oil deposits.--Author's abstract.

(1165) SEARCH FOR OIL IN PARMA DISTRICT, WESTERN ITALY

By M. Anelli and A. Belluigi

Bulletin of the American Association of Petroleum Geologists, Tulsa, vol. 16, No. 11, 1932, pp. 1152-1159.

The Parma district of northern Italy offers many difficult geological and geophysical problems. The writers briefly outline the stratigraphy and major structural features of the northern foothills of the Apennines, and the hidden surface structure of the Po Valley. Results of recent drilling have substantiated many of the geophysical interpretations.

There is a series of parallel folds trending northwest and southeast in the foothills, and also in the subsurface of the plains. Secondary folding at right angles has produced closed domal structure, with tertiary strata coming near the surface. Some dislocation with diapirism has been suspected from geophysical studies and proved by drilling.--Authors' abstract.

(1166) GEOPHYSICAL PROSPECTING IN GULF COAST DISTRICT HAD TO OVERCOME MANY DIFFICULTIES

By W. P. Jenny

The Oil and Gas Journal, Tulsa, vol. 31, No. 8, 1932, pp. 14-16.

This is to correct the misprint entered into the abstract under the same title published in Geophysical Abstracts 42, p. 618. The last paragraph should read as follows:

"B. Detail survey. The figures for reconnaissance surveys multiplied by three to five for torsion balances and two to three for reflection shooting might give an approximate idea for detailing a structure by the respective methods. The cost-figures refer to surveys made by consulting companies. If the work is done by the oil company itself, the figures should be reduced to about two-thirds to three-fourths of the above quotations."--W. Ayvazoglou.

9. NEW BOOKS

1167) Haalck, H., Heine, W., Hummel, J. N., Jung, K., Martin, H., Meisser, O., and Reich, H. Handbuch der Experimentalphysik. Angewandte Geophysik (Applied geophysics), Leipzig, 1930. vol. 25, part 3, 556 pp.

1168) Bonsdorff, J. Verhandlungen der in Kopenhagen vom 13 bis 18 Oktober 1930 abgehaltenen fünften Tagung der baltischen geodätischen Kommission. Helsinki, 1931. (Transactions of the fifth meeting of the Baltic Geodetic Commission held in Copenhagen from October 13 to 18, 1930. Helsingfors, 1931). Of interest are: (1) E. Kohlschütter's report on the light two-pendulum apparatus constructed according to Kohlschütter's instructions by the Prussian Geodetic Institut and assigned to gravity measurements in the Greenland inland-ice region; (2) O. Meisser's report on the Jena pendulum apparatus and methods of observation for accurate relative gravity measurements.

1169) Davies, G. M. A French-English vocabulary in Geology and Physical Geography. Thos. Murby and Co., London, 6 s. net.

1170) von Flotow, A., Berroth, A., and Schmehl, H. Relative Bestimmung der Schwerkraft auf 115 stationen in Norddeutschland (Relative determinations of gravity at 115 stations in North Germany). Veröffentlichungen des Preussischen Geodetischen Institutes, Potsdam, 1931, Neue Folge No. 106, 100 pp.

1171) Heiland, C. A. Directions for the use of the Askania Torsion Balance. American Askania Corporation, Houston and Chicago, November, 1932, 88 pp. The aim of this pamphlet goes far beyond that of giving instruction for the mere mechanical operation of a certain type of instrument. It presents not only a summary of the entire field of torsion balance practice, but also a study of the geometric disposition and physical significance of the forces measured by the torsion balance, the latter leading up in an elementary manner to the well-known fundamental equation. This is followed in logical order by instructions on how to calculate the gravity data from the instrumental records obtained in 3, 4, or 5 positions, and how to compute the planetary and topographic corrections. An ample number of forms, graphs, and tabulations are given to expedite such computations in routine work. The representation of the corrected data in form of maps, and gradient, curvature, and gravity profiles is described; methods of interpretation are discussed, and formulas for 2-dimensional effects are given.

The balance of the book contains instructions for the most efficient operation of the instrument and its application in the field; such topics as the replacement of wires, the adjustment of balance beams, changes in instrumental constants when replacing wires, the selection and preparation of a station site, the methods of terrain observations, and transportation of instruments and houses are discussed.

The latest advances in torsion balance instrumental and interpretative technique, such as the reduction of beam displacements due to air currents, graphical methods in terrain and subterranean effects, and the use of integraphs for the same purpose have been considered.

A chapter on the cost of torsion-balance work, and a selected bibliography are appended.--C. A. Heiland.

(1172) Terrestrial magnetism and atmospheric electricity. Conducted by J. A. Fleming. vol. 37, No. 3, September, 1932, pp. 203-420. Published for the Johns Hopkins Press, Baltimore, The Ruter Press, 420 Plum St., Cincinnati, Ohio (E. G. Allen and Son, Ltd., 14 Grape Street, London, W. C. 2). Price, $1.00. This number is published to honor the memory of Louis A. Bauer, founder of the journal and from 1896 to recent years its editor. Therefore this number is devoted to articles in personal appreciation and to discussions of those varied themes within its field which engaged his active interest. Contents: (1) Louis Agricola Bauer and terrestrial magnetism, by A. Nippoldt; (2) Louis Agricola Bauer in the process of science as exemplified in terrestrial magnetism, by G. W. Littlehales; (3) cooperative work of the Department of Terrestrial Magnetism under the directorship of Louis A. Bauer -- an acknowledgment, by H. U. Sverdrup; (4) the magnetic survey of New Zealand, by C. Coleridge Farr and Henry F. Skeg; (5) the development of the magnetic survey of Canada, by W. E. W. Jackson; (6) Louis A. Bayer and the Zi-Ka-Wei Observatory, by J. de Moidrey, S. J.; (7) the magnetic survey and observatory-net of the United States, by N. H. Heck; (8) principal published papers of Louis A. Bauer, by H. D. Harradon; (9) Das Rätsel der erdmagnetischen Säkularvariation, by Adolf Schmidt; (10) secular change of the earth's magnetism, by Daniel L. Hazard; (11) the unsymmetrical distribution of magnetic secular variation, by Harlan W. Fisk; (12) distribution of magnetic elements and of their annual changes in the vicinity of the magnetic pole, by Boris P. Weinberg; (13) distribution of magnetic observatories and secular variation stations, by J. A. Fleming; (14) magnetic characterization of days, by G. van Dijk; (15) the magnetic character of the year 1931 and numerical magnetic characterization of days, by G. van Dijk; (16) magnetic activity--numerical magnetic character of days, by C. R. Duvall; (17) the field energy of magnetic storms, by S. Chapman; (18) periodo diurno, anual y secular en las perturbaciones subitas del campo magnetico terrestre, by Luis Rodés, S. J.; (19) Die Magnetisierung der Erde nach der geomagnetischen Konstanten der Observatorien, by A. Nippoldt; (20) note on the magnetic potential at the geographic pole, by L. Steiner; (21) statistical methods for research on diurnal variations, by J. Bartels; (22) seasonal magnetic variations at Apia, by P. W. Glover; (23) Einige Ergänzungen der klassischen deviations-theory, by H. Meldau; (24) the distribution of mass in marine compasses, by W. J. Peters; (25) improvements in magnetic instruments and methods adopted by the Coast and Geodetic Survey, by H. E. McComb; (24) earthquakes recorded by magnetograph, by Daniel L. Hazard; (27) Magnetische Vermessungen in Deutschland, by K. Haussmann; (28) magnetic work of the Dominion Observatory, Ottawa, Canada, 1907-32, by C. A. French; (29) a demonstration of geologic possibilities of the resistivity and magnetic prospecting methods, by C. A. Heiland; (30) Études sur l'électricité atmosphérique au Val-Joyeux et a Paris, by Ch. Maurin; (31) on potential gradient and the air-earth current, by F. J. W. Whipple; (32) observed air-earth current and maintenance of earth's charge, by O. H. Gish; (33) the significance and accuracy of measurements of earth-current potentials, by W. J. Rooney; (34) how the horseshoe-formed auroral curtains can be explained by the corpuscular theory, by Carl Störmer; (35) the temperature of the auroral region determined by the rotational series of the negative nitrogen-bands, by L. Vegard; (36) the cosmic-ray observatory on the Hafelekar (2,300 m.) near Innsbruck (Austria) and its first results, by Victor F. Hess; (37) letters to editor: On the vertical component of the earth-current in mountainous regions, by J. G. Koenigsberger; the anomalous mountain-effect in earth-current measurements, by O. H. Gish; Lettre à tous les observatoires magnétiques, by Ch. Maurin, Jno. A. Fleming, and D. laCour; American U.R.S.I. broadcats of cosmic data, by Katharine B. Clarke; provisional solar and magnetic-charter figures, Mount Wilson Observatory, April, May, and June, 1932, by Seth B. Nicholson and Elizabeth E. Sternberg; provisional sunspot-numbers for June, July and August, 1932, by W. Brunner; (38) principal magnetic storms; Sitka Magnetic Observatory, April to June, 1932, by Franklin P. Ulrich; Cheltenham Magnetic Observatory, April to June, 1932, by Geo. Hartnell; Huancayo Magnetic Observatory, January to June, 1932, by Paul G. Ledig; Wateroo Magnetic Observatory, January to June, 1932, by W. C. Parkinson; (39) reviews and abstracts: Defant, A., Wissenschaftliche Ergebnisse der Deutschen Atlantischen Expedition auf dem Forschungs -- und Vermessungsschiff "Meteor" 1925-1927, F. M. Soule; Fleming, J. A. (editor) Transactions of the American Geophysical Union, Thirteenth Annual Meeting, April 28 and 29, 1932, H. D. Harradon; (40) Notes: International Polar Year Stations 1932-1933; International Congress of Electricity, Paris, 1932; Magnetic survey of Austria; aurora Australis, May 29-30, 1932; exhibition of "Aeroarctic;" cosmic-ray observations; magnetic observations during eclipse of August 31, 1932; errata; personalia; (41) list of recent publications, by H. D. Harradon.

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